National SCIENCE Challenges

SUSTAINABLE SEAS

Ko ngā moana whakauka

Core research project portfolio

Theme 2: *Creating value from a blue economy*

Phase II (2019–2024)

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Introduction

The Sustainable Seas National Science Challenge is pleased to present the core research project portfolio for the *Creating value from a blue economy* theme for Phase II of the Challenge. Note that the project concepts for the other themes and the Tangaroa programme can be found here: Phase II Core Research Project Portfolio

The Challenge **Objective** is:

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

and our **Mission** is:

"To transform Aotearoa New Zealand's ability to enhance our marine economy, and to improve decision-making and the health of our seas through ecosystem-based management".

Delivering on the Challenge Objective requires extensive knowledge of ecological functioning and how it is affected by human activities, the economic potential of marine resources, and the social, cultural and environmental values, rights and interests that must be balanced through effective management and decision-making.

Ecosystem-based management (EBM) is a holistic and inclusive approach to managing marine environments and competing uses for them, demands on them and the ways New Zealanders value them, and to supporting healthy resilient marine ecosystems. Drawing on Māori knowledge and practice, international literature and discussions with marine managers, Sustainable Seas determined that the best way to meet its Objective is to provide research that will underpin an EBM approach specifically for Aotearoa New Zealand's unique needs and aspirations. Using an EBM approach will lead to fundamental changes in the way we manage our marine environment and the future development of our blue economy.

This holistic approach enables consideration of multiple and cumulative stressors on marine ecosystems, scientific knowledge and mātauranga Māori, and risk and uncertainty in decision-making. EBM tailored for New Zealand circumstances will provide for co-governance in the context of the Treaty of Waitangi partnership where the rights and perspectives of Māori are central to all questions of healthy and prosperous ecosystems. It will also allow for adaptive management approaches and more transparent decision-making processes.

Sustainable Seas will provide underpinning research and tools to support the design and implementation of an EBM approach tailored to Aotearoa New Zealand. Partnering with central and regional government, Māori, industry and other stakeholders is critical for the implementation of EBM and the success of the Challenge.

The development of a blue economy will also be supported by EBM through underpinning sustainability of healthy marine ecosystems. A blue economy is not a 'business as usual' marine economy. Rather, it builds sustainable economic value through investment and production practices that balance growth with a focus on value-add, the long-term ecological health of marine ecosystems, and local, regional and national sustainable development goals. A blue economy recognises all dimensions and beneficiaries of the marine economy and all values that marine environments currently produce. This vision of marine economy is increasingly expected by ethical investors, global consumers and Aotearoa New Zealand's key global economic and political partners. This aligns with Aotearoa New Zealand's movement toward transforming how it defines and understands success, particularly economic success. Many public and private sector leaders are looking beyond short-term financial targets and are reviewing how to safeguard our future prosperity and create sustainable wealth. This is consistent with a Te Ao Māori approach where intergenerational well-being and prosperity is at the heart of decision-making. The Treasury, Ministry for the Environment and Statistics NZ are also investigating the best way to value our natural capital.

Sustainable Seas National Science Challenge will measure its success by:

- Sustainable Seas Challenge research being incorporated into policy frameworks to support EBM;
- Tools and knowledge developed being used in decision-making for the marine environment;
- Proof of concept for an EBM approach to marine management being successfully demonstrated;
- A vibrant blue economy developing regionally and nationally, enabled by Sustainable Seas research;
- Māori knowledge, rights, interests and values underpinning our outputs and approaches; and
- Science from the Challenge being published in high-quality international journals.

Implementation of the research is critical to developing EBM as an approach for marine management in New Zealand. We will achieve this by:

- Co-developing proposals with Māori and stakeholders;
- Involving Māori and stakeholders, particularly environmental managers, directly in research projects;
- Engaging and co-designing outputs with Māori and stakeholders to ensure they are fit for purpose;
- Applying Vision Mātauranga to all Themes and Programmes;
- Implementing multiple case studies of EBM approaches to decision-making; and
- Ensuring that data collected are widely and freely available.

Theme 2: Creating value from a blue economy

Indicative Phase II Theme budget: $ 3,216,900

Securing and enhancing the ecological health of New Zealand's oceans requires a marine economy that is committed to ecologically sustainable practices, just as sustainable economic utilisation of marine resources requires healthy marine ecosystems. These interdependent sets of goals must also respond to the shifting needs and concerns of communities.

The concept of blue economy has become a cornerstone for debating marine futures around the world. At its core, a blue economy is built on four propositions: (1) societies must look to the oceans to secure their food, energy and wider economic futures; (2) oceans offer enormous opportunities for economic development; (3) realising these opportunities will require significant investment in science and technology; and (4) growth must involve a fundamental transition to ecologically, culturally and socially sustainable economic activities. New international environmental and social equity initiatives, enhanced expectations of corporate environmental, cultural and social responsibility, and ever-deepening concerns about the ecological impacts of marine economies, mean that definitions of 'sustainability' are sharpening and require new, and transparent actions by businesses.

In the Aotearoa New Zealand context, there are further drivers towards a blue economy. These include the requirement and opportunity inherent in the incorporation of Te Ao Māori world views into resource management, the introduction of a four capitals (Human, Natural, Social and Financial) approach to guiding central government policy and a four well-beings (Social, Environmental, Cultural, Economic) approach to local government, and the ever-pressing need to ensure access to overseas markets and add value by demonstrating strong environmental performance.

In order to respond to these drivers and meet the Sustainable Seas Objective through an EBM approach to marine management, the Challenge will support the development of ***a blue economy that is made up of marine activities that generate economic value and contribute positively to social, cultural and ecological well-being***. This broad definition of a blue economy is designed to capture a wide range of initiatives to align existing marine economy activities with principles of sustainability but is also intended to encourage a profound transition away from business as usual to an economy that will support sustainable seas. Research undertaken in Phase I has shown that Aotearoa New Zealand has a growing marine economy, with many enterprises beginning to develop blue economy initiatives and position themselves to take advantage of its opportunities (EnviroStrat 2019; Market Economic 2019). Blue economy initiatives are being led by a range of champions at different scales and across different sectors, and increasingly a thriving Māori blue economy is leading the way.

Further transition to, and growth of, this blue economy will not just happen by itself. Internationally, it is recognised that while some business will see opportunities and take the leap, others will not - often intensifying conflicts among resource users and generating unnecessary tensions for resource management agencies. Transition pathways have to be built through investment, new science and technology, altered commitments, practices and objectives, and new measures of performance. This will require demonstrations of the value of new approaches, institutions that foster a new economy, and new regulatory frameworks such as EBM.

Theme 2: *Creating value from a blue economy* will both support and draw on research in Theme 3: *Addressing risk and uncertainty* to foster and de-risk new investment initiatives. It will ask how ecological recovery can be linked more effectively to blue economy opportunities at local, regional and national scales and seek to apply ecological knowledge from Theme 1: *Understanding ecological responses to cumulative effects* to build restorative economies. It will also ask how new sectors can be built within an EBM framework, drawing on and adding new dimensions to research in Theme 4: *Enhancing EBM practices*. Blue economy research on the ground will intersect closely with the full suite of Tangaroa Programme projects, especially with respect to concerns with community-level economic activities, non-monetary resource utilisation, and the wider indigenisation of blue economy at multiple scales.

Research will be complemented by the Innovation Fund 2020, which will make funding available to support for innovative blue economy research co-funded by interested parties.

Blue Economy Projects

The core research projects within this Theme support the development of a blue economy by:

- demonstrating and developing the potential of EBM to support sectoral and cross-sectoral economic opportunities;
- conducting the research necessary to encourage positive change among existing activities, support and secure transitions pathways already in train, and encourage innovation and investment in new blue economy futures; and
- Identifying research needs, designing measures, applying tools and approaches, and supporting the development of regulatory and decision-making settings to achieve these goals.

The proposed suite of projects is linked by five interwoven objectives: (1) integrating economy and EBM to support economic activities, advance sustainability transitions, and encourage transformative economic growth; (2) developing sectors poised for major investment within an EBM framework; (3) encouraging and normalising transformational economic thought and practice; (4) seeking out and materialising opportunities for multiple benefits; and (5) indigenising blue economy. There are multiple links between projects. Seaweed and regenerative eco-tourism offer significant opportunities for restorative co-benefits, from carbon markets to ecosystem services, and active ecosystem restoration. Māori are heavily involved in blue economy tourism and have interests in developing seaweed economies – there are strong overlaps between indigenising these sectors and guiding their development within an EBM framework. Iwi are primary investors in restorative economies and see them as offering multiple opportunities to deliver simultaneously ecological, cultural, and economic benefits. The indigenising dimensions of New Zealand restorative economies are highly attractive to investors.

Individually and as a suite, the projects are opportunity-focused and ambitious. They promise to attract international attention and demonstrate international leadership in sustainability transitions, how to build blue economy within an EBM framework, and economic development for environmental restorative justice. They will work in tandem with the Innovation Fund to underline livelihoods and attract and support investment into new and existing sectors.

Development of core research projects for the Theme 2: *Creating value from a blue economy* portfolio

The core research projects for this theme (Table 1) which are critical to meeting the Challenge Objective have been identified based on research conducted in Phase I, the Strategy for Phase II (2019-2024), the *Transitioning to a Blue Economy: Scoping and Horizon Scanning* report outlining directions in Aotearoa New Zealand's Blue Economy, and input gathered from two co-development workshops with Māori and stakeholders held in December 2019 and February 2020.

The feedback we received on the initial project concepts developed in 2019 for the Theme 2: *Creating value from a blue economy* draft portfolio led us to fund a small exploratory project (*Transitioning to a blue economy in New Zealand)* designed to establish a basis for co-developing the requirements and activities of future projects in this Theme. The report *Transitioning to a Blue Economy: Scoping and Horizon Scanning*, collated iwi and stakeholder views and an analysis of current trajectories in the domestic and international blue economy. It identified a set of priority concerns and research opportunities, which were workshopped with Māori, researchers and stakeholders in February 2020.

The final workshop identified a suite of interconnected projects to support emerging sectors and directions in blue economy within EBM frameworks. They will underpin transitions to a blue economy in a changing world.

This portfolio of core research projects contains concept outlines of each project, not fully developed proposals, as we will be co-developing the research projects with researchers, Māori and stakeholders and do not want to pre-empt this process. They do however clearly identify the research that is required.

Table 1: Indicative Phase II Project budgets (2019 – 2024) for core research projects in Theme 2: *Creating value from the blue economy*

Indicative Budget 2019 - 2024	Core portfolio projects
$3,216,900	**TOTAL**
$90,000	2.1 *Transitioning to a blue economy in New Zealand* (project complete)
$900,000	2.2 *Encouraging restorative economies in NZ marine spaces*
$800,000	2.3 *Indigenising the blue economy in Aotearoa*
$500,000	2.4 *Growing blue tourism from low impact principles*
$500,000	2.5 *Building a blue economy sector – seaweed*
$426,900	*Unallocated* [1]

[1] As noted in the table, the budgets for the five blue economy core projects are indicative. The unallocated amount provides the Challenge with some flexibility to revisit core project budgets where we consider those projects might require scope adjustments once full proposals are provided. This unallocated funding also enables the potential to leverage unanticipated opportunities that could arise outside the scope of the core projects.

Links to Theory of Change Outputs

The projects are clearly linked to the Road Map of outputs and outcomes for the Challenge that has been developed for Phase II (Theory of Change Outputs and Outcomes; Tables 2 and 3). These links will be identified in more detail as the full project proposals are developed and the outputs of the projects identified.

Table 2: Theme 2: *Creating value from a blue economy* project links to Theory of Change **Outputs**

		Theme 2: Creating value from a blue economy				
		2.1	2.2	2.3	2.4	2.5
a.	Biophysical and socio-ecological knowledge that supports the development of understanding and tools that underpin EBM as a viable approach to managing Aotearoa New Zealand's marine environment developed and accessibly packaged.					
b.	Traditional, local and other cultural knowledge that supports EBM is captured/understood/recognised.					
c.	Effective partnership models for an EBM approach to decision-making and management developed, evaluated, and demonstrated.					
d.	Decision-making processes that recognise risk and uncertainty evaluated, developed, and demonstrated.					
e.	Scales of management and place-based strategies that reduce environmental risks are identified and demonstrated.					
f.	Tools for predicting and managing cumulative and multiple stressors developed, assessed and demonstrated.					
g.	Governance and policy practices that support EBM identified, evaluated and packaged for targeted decision-makers.					
h.	Frameworks for decision making that consider multiple values and blue economy activities developed and evaluated.					
i.	Guidelines developed, opportunities identified and innovations, for transitioning to a blue economy for businesses operating in the marine sector.					
j.	Guidelines for participation in EBM decision-making processes evaluated, refined and packaged for targeted iwi, stakeholders and decision-makers.					
k.	Pathways for knowledge, understanding and skills developed by the Challenge to be understood by iwi and stakeholders are developed.					
l.	Remaining knowledge gaps that increase environmental risks of decision making are identified for iwi and stakeholders.					

Table 3: Theme 2: *Creating value from a blue economy* project links to Theory of Change **Outcomes**

		Theme 2: Creating value from a blue economy				
		2.1	2.2	2.3	2.4	2.5
1	The value of blue economy business models is recognised and adopted by Aotearoa New Zealand businesses					
2	Decision-making practices that are more inclusive, multi-sectorial and account for the effects from cumulative and multiple activities are adopted					
3	Knowledge from the Challenge (science and mātauranga) is used in decision making to improve ecological health and influences Aotearoa New Zealand's marine management practice and policy					
4	The complementarity of local expressions of Kaitiakitanga and EBM are well understood and enabled					
5	Decision-making processes explicitly identify and address both risk and knowledge uncertainty in a way that reduces risks to ecological, social, cultural and economic wellbeing					
6	EBM practices are understood and accepted as a viable approach by decision makers, stakeholders and iwi					
7	Māori rights, interests and values are supported through the application of EBM					
8	Researchers and iwi and stakeholders involved during the life of the Challenge continue to actively promote, research in, and use knowledge from the Challenge					

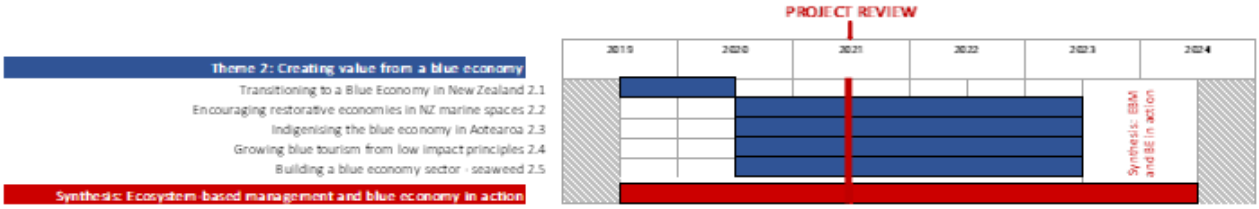
All the research projects will feed into the "EBM and blue economy in action" synthesis. The synthesis knowledge and the regional case studies will enable knowledge and tools (i.e., models, frameworks, guidance, indicators) developed in Phase I and Phase II to be trialled, evaluated and refined for future implementation in EBM. Projects within each Theme and Tangaroa are closely linked and links and dependencies with other projects have been identified within these project concepts.

A strong Vision Mātauranga oversight will be maintained across the breadth of the Challenge research, and its approach to working with Māori. This will be achieved through resourcing specific support and initiatives that will assist and guide science leaders and researchers in the application of the Vision Mātauranga Policy to ensure clear and beneficial pathways for the delivery and uptake of research outcomes for Māori. This will include proactively creating and supporting mechanisms for building capability and capacity, as well as effective engagement, communication and relationship management with iwi, hapū and Māori organisations.

The timeline for each of the projects is outlined in Table 4. It should be noted that all projects spanning more than the initial two years will be reviewed in mid-2021 to ensure that the projects are delivering what is needed to meet the Objective and remain a priority for the Challenge. The final year of the Challenge, 2023-2024, will focus on the synthesis of all knowledge and tools developed during the life of the Challenge to ensure the overall outcome of the Challenge is greater than the sum of the parts.

Projects 2.4 *Growing ecotourism in a Blue Economy* and 2.5 *Building a blue economy sector - seaweed* will be conducted in two stages. The first stage as outlined in these initial project concepts will establish the basis for case study analysis in Stage 2, the broad nature of which is also outlined. The focus of the case studies will be developed during the Stage 1 of the projects.

Table 4: Theme 2: *Creating value from a blue economy* projects timeline



Next steps

Now	• Project concepts reviewed by Challenge Kāhui and Stakeholder Panel, Independent Science Panel, and the participants of the co-development workshops. • Project concepts revised, addressing feedback received, and recommendation made to Challenge Governance Group for approval to proceed with developing full research project proposals.
May - Jun 2020	• Project Leaders identified, along with best teams for developing full project proposals. This will include discussions with Māori and stakeholders regarding their involvement in the co-development of the research projects.
Jun - Sep 2020	• Project proposals co-developed with Māori and stakeholders.
Oct 2020	• Project proposals reviewed – peer, industry and Māori independent reviewers, Challenge Kāhui and Stakeholder Panel, Independent Science Panel, Challenge Leadership Team.
Nov 2020	• Funding for projects in portfolio approved by Governance Group. • Contracting of projects begins.

Project concepts

Project title	2.2 Encouraging restorative economies in NZ marine spaces
Problem definition	The transition from ocean to 'blue' economy will require new visions of economic possibilities, creative identification and capturing of multiple benefits, and innovative investment approaches. Restorative economies aim to achieve multiple benefits from attracting impact investment and business initiatives that directly target ecological enhancement. They range from multi-trophic aquaculture and combined aquaculture/wild fisheries/eco-tourism to locally specific initiatives that will generate multiple benefits for ecological health, social and cultural well-being and within-community jobs, businesses and investment. By their multi-activity and multiple benefit foci, restorative economies create economic diversity and resilience and promote environmental and social diversity and resilience. Restorative economies can be developed to dovetail with EBM, particularly as national economies deal with the need to "do economy differently" driven by climate change, ethical and responsible governance and investment strategies, government stewardship strategies, and consumer priorities. Restorative economies are in their infancy in New Zealand (e.g. Te Waihora, Auckland Council) but are gaining momentum and attracting regional councils and iwi as well as philanthropic, green impact investors, and novel community-scale ecological entrepreneurs. They offer distinct opportunities for iwi and local governments to meet cultural and environmental goals and responsibilities associated with ecological regeneration and community resilience, whilst attracting largescale investment into blue economy. They maximise co-benefit opportunities for Māori blue economy, community aquaculture and tourism enterprises, and enterprises seeking to invest in aquaculture to meet carbon targets and climate change obligations. Restorative economies are an important opportunity for building alliances between investors, local governments, iwi regulatory agencies, communities and existing sectors, which will encourage transitions to sustainability. Merging present understandings of "restorative economies" with EBM requirements (which by definition includes ki uta ki tai) will allow restorative economies to move from fringe activities into a mainstream approach. As yet, these opportunities are poorly understood and restricted by silo approaches (issues, sectors) and conflict with present traditional sector industries. Creating an enabling environment for restorative economies will require a focus on investor demands with respect to scales of investment and a degree of certainty with respect to markets, standards, prices, regulations and consents. In turn, this needs new understandings of the interplay between monetary and non-monetary economies (value creation), co-benefits with present industries, and new measurement (local and regional economic success, social and cultural well-being, stressor reduction, ecosystem services, resilience) and management infrastructure (EBM).
Research question(s)	1. What is the potential for marine restorative economies (RE) in New Zealand, what benefits can be identified and captured at different scales, and for different groups? What needs to be done to enable them? 2. What institutions, structures, practices, information and measures form the template that will allow the creation and management of RE within a multi-use EBM framework that is aligned to Four Well-beings and Four Capitals approaches to economic governance? 3. In what ways can restoration economies be aligned with the Māori blue economy?

Research activities	Specifics of activities, case studies and outputs will be developed in conjunction with co-development partners. This research will involve: 1. A review of international models and best practice (enterprise, innovative finance, impact assessments and ecological infrastructure) for restorative economies, including standards, pricing and mechanisms used to screen for likelihood of successful outcomes/targets. 2. A stocktake of the range of restoration initiatives currently in play in New Zealand, that directly or indirectly effect marine resources/ecological health. During this process, two case studies will be selected for more in-depth participation and action-learning. These case studies need to allow for development of a multi-scalar understanding and the likely consequences of isolated vs connected activities. 3. Identifying multi-benefits (including ecological resilience) and opportunities/risks for RE in the NZ marine context within an EBM-kaitiaki framework. This is likely to include developing Return on Investment (RoI) metrics/frameworks as well as methods for assessment of restoration success and prioritisation of activities - what options are best in terms of benefits, risk and returns? 4. Identifying roles, instruments, and criteria, and contributing to the measurement infrastructure required for different stakeholders to grow restorative economies, particularly information and reporting required by regional councils and central government agencies on the anticipated ecological, social and cultural benefits and the likely success rates. 5. In-depth analysis/modelling of at least two selected initiatives in locations where benefits are related to the four well-beings, transitional risks are investigated, and potential de-risking strategies identified. These will need to align with EBM considerations and will ideally link strongly with other projects (e.g. RA2, 1.1, 3.1 and 3.2).
ToC Outputs	i. Guidelines developed, opportunities identified and innovations, for transitioning to a blue economy for businesses operating in the marine sector. h. Frameworks for decision making that consider multiple values and blue economy activities developed and evaluated.
ToC Outcomes	1. The value of blue economy business models is recognised and adapted by Aotearoa New Zealand businesses.
Critical skills required	• Environmental economics • Green finance • Industry connectivity • Four capitals accounting • Ecosystem services measurement • Values assessments (esp. non-market and non-monetary) • Marine/estuarine ecology • Regulatory knowledge • Regional development expertise • NZ economic and social and statistics
Potential location(s)	While the overarching problem is national, requiring national solutions, restorative economies inevitably operate at a local-regional scale, requiring trials and evaluations at this smaller scale. Potential locations include: Hauraki Gulf (with AC), Marlborough Sounds, Waituna Lagoon (with Ngai Tahu). Linkages with other projects are likely to extend these possibilities into other areas (e.g., Tasman/Golden Bay). Locations will be finalised as part of the co-development process.
Potential collaborations & co-development partners	Statistics NZ; Ngai Tahu Research Centre; Regional Councils; Aquaculture NZ; MfE; TOKM; DOC; Sustainable Business Network; Responsible Investment Assn; philanthropists; MPI/Fisheries NZ; Green investment researchers; hapū and whanau (through Tangaroa projects); NGO; community members; MPI/Fisheries NZ; New Zealand green investment fund.
Links to and dependencies with other Themes / Tangaroa	2.1 Transitioning to a blue economy 2.4 Blue tourism 2.5 EBM and seaweed 3.2 (which needs to include ability to assess business risks and uncertainties), 1.1 (assessment of ecological footprints, defining restoration, prioritizing restoration actions and understanding CE and hysteresis), 1.2 (tools for spatial planning and maintaining systems capacities), 4.2 (identifying/addressing regulatory options/barriers), and 4.2/T2 (links between restorative economies and restorative justice).
Timing	July 2020 to June 2023

Building on which Phase I research	3.2.1	Whai Rawa, Whai Mana, Whai Oranga: the Māori marine economy
	2.2.2.7	New blue economy in Kaikōura: participatory process approach
	2.2.1	Creating value from a blue economy
	2.1.3	Measuring ecosystem services and assessing impacts
	2.1.1	Development of valuation frameworks and principles
	2.1.2	Mauri Moana, Mauri Tangata, Mauri Ora - Documenting social values
	1.2.1	Frameworks for achieving and maintaining social licence
	2.2.2.1	Coastal acidification mitigation strategies
	2.2.2.2	Re-use of offshore infrastructure and platforms

Project title	2.3 Indigenising the blue economy in Aotearoa
Problem definition	Māori aspire to be self-determining indigenous people and are actively pursuing a development agenda grounded in a Māori world view. A Māori world view has the capacity to radically alter conceptualisations of New Zealand's marine and terrestrial economies, restoring socioecological relationships with these entities as kin.The Māori marine economy can be understood to be *mana*-enhancing and *mauri*-inducing, underpinned by mātauranga Māori, and tikanga Māori. The outcomes for many Māori enterprises centre on realising and distributing wellbeing, not just through generating an economic return but also through providing social, environmental, and cultural benefits to our communities. The ability for Māori to actively operate in this way is often constrained by several factors, including: • Providing for Māori Treaty rights and interests to the furthest extent possible; • The absence of Māori influence in institutional and regulatory arrangements; • More fully understanding and applying tikanga and mātauranga-based approaches; • Creating added value through sustainability, branding, provenance and indigeneity; • Economic modelling to generate and distribute multiple forms of Māori wellbeing; • Empowering mana whenua and meaningfully engaging Māori communities; • Complementarity between commercial and customary Māori rights and interests. Mitigating or eliminating these constraints will open the door to a world class blue economy here in Aotearoa that is informed by Māori indigenous approaches and principles (i.e. indigenised). This project will examine the challenges and opportunities presented by these factors and develop approaches to overcome them. We will leverage previous research, explore existing examples of Māori and indigenous blue economy approaches, and examine treaty partnership models to enable a transition to a blue economy founded on New Zealand's cultural context. We will explore use of credence and provenance values (e.g. through indigenous certification approaches) to incentivise such a transition. As well as recognising existing Māori rights and interests within the marine environment, we will explore marine-based tourism, blue technology, restoration economies, and new sectors such as open ocean aquaculture and seaweed through relationships with other blue economy projects.
Research question(s)	1. What does a multi-sector Māori Blue Economy look like at regional and national levels? 2. What would an indigenised New Zealand Blue economy look like, what opportunities and benefits would it offer and what risks and challenges must be addressed to achieve it? 3. What institutions, structures, practices, information and measures would be required to create and realise the opportunities of an indigenised New Zealand blue economy?
Research activities	The research activities listed below are high level because greater depth and detail will need to be identified by co-development partners to ensure greatest relevance, benefit and impact. • Build on Phase I research (which focussed on fisheries) to further identify, characterise, document, and map Māori blue economy activities (ie aquaculture, marine–based tourism, blue technology, transport), business models and governance structures (ie individual Māori, whanau, hapū, iwi, commercial entities, pan-iwi entities) across Aotearoa. • Investigating by way of case studies, the defining characteristics of successful Māori businesses and organisations operating within and contributing to a Māori blue economy. • Creating a quadruple bottom line framework for Māori blue economy activities to support the development of innovative new business models. • Investigate the characteristics of successful indigenous and orthodox marine product tracing, branding and certification schemes to determine the viability and approach to the potential development of a Te Ao Māori model and how this can be used to incentivise a transition to an indigenised blue economy for Aotearoa. • Working alongside enterprise champions (Māori and non- Māori), constructing and trialling pathways, frameworks and models to achieve indigenous blue economy approaches in Aotearoa.
ToC Outputs	i. Guidelines developed, opportunities identified and innovations, for transitioning to a blue economy for businesses operating in the marine sector. h. Frameworks for decision making that consider multiple values and blue economy activities developed and evaluated

ToC Outcomes	1. The value of blue economy business models is recognised and adapted by Aotearoa New Zealand businesses. 3.Knowledge from the Challenge (science and mātauranga) is used in decision making to improve ecological health and influences Aotearoa New Zealand's marine management practice and policy.
Critical skills required	• Business development • Building indicators • Measures of Māori economy success • Māori economy analysis • Kaitiakitanga • Sustainability certification and metrics • Science for EBM • NZ economic statistics
Potential location(s)	National scale question with trials and evaluations at regional scale, with potential localities including Ōpōtiki, Hawkes Bay, Auckland and yet to be determined South Island sites.
Potential collaborations & co-development partners	Individual Māori, whānau, hapū business enterprises; Iwi authorities; Te Ohu Kaimoana; Māori commercial entities; Relevant central and local government agencies
Links to and dependencies with other Themes / Tangaroa	Links to other core BE projects including the potential to connect/align case studies and research initiatives. Links to other Challenge projects: • T1 (where economic initiatives and implications are explored) • 3.1, 3.2 (including understanding and mechanisms of considering and assessing risk from a Te Ao Māori perspective) • 4.1, 4.2, 4.3 (informing practices, rights, interests, policy, regulatory and policy implications) • Synthesis projects (tbc) • Regional Case Studies (tbc)
Timing	July 2020 to June 2023
Building on which Phase I research	Whai Rawa, Whai Mana, Whai Oranga: the Māori marine economy Whaia te Mana Māori Whakahaere Tōtika ki Tangaroa: In pursuit of Māori governance models over marine resources New blue economy in Kaikōura: participatory process approach Creating value from a blue economy Measuring ecosystem services and assessing impacts Development of valuation frameworks and principles Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment He Poutokomanawa: kaitiakitanga in practice Mauri Moana, Mauri Tangata, Mauri Ora - Documenting social values Huataukina tō iwi e: Developing marine bioactives from kina

Project title	2.4 Growing ecotourism in a blue economy
Problem definition	Aotearoa New Zealand's tourism industry relies heavily on coastal spaces, with tourism in recent years being the nation's largest marine sector. Many marine tourism activities are centred on ecotourism (small-medium scale enterprises, minimal environmental impact, high productivity, conservation-focused, community-oriented activities). Multiple prominent marine tourism enterprises, often Māori-led, operate in this broad space. Expanding these activities in novel directions and growing a new generation of marine ecotourism will help to achieve sustainability goals and deliver diverse economic, community, and ecological benefits. This potential is recognised in the sustainability emphasis of current government tourism policy, and specific calls to diversify product offerings, spread the benefits and impacts spatially, and anchor future development within a credible sector-wide assurance and accreditation system for sustainability. DOC is exploring the potential of regenerative tourism products that actively enlist tourists in conservation activities to enhance their experience. There are significant opportunities to translate regenerative tourism into coastal spaces and estuaries, and to connect ecologically focused experiences to seafood, aquaculture and cultural experiences. Blue ecotourism opportunities are potentially much more significant in a short to medium term context fundamentally reset by COVID-19. Tourism enterprises and the coastal communities relying upon them will need to develop new products, networks of interaction, and balances between scales of activity. Pressures to pursue higher value, lower volume international tourism and increased domestic tourism will intensify. Lower impact, higher value, ecologically sensitive and quality assured blue ecotourism products will help enterprises, Māori, and tourism stakeholders to recover. They will also support tourism more generally to address ongoing concerns to do with the climate change impacts of travel, build resilience to future shocks, and encourage a new generation of green narratives for promoting regional and national tourism. The potential of blue ecotourism is under-examined. Taking advantage of its opportunities will require urgent attention to critical baselines, including the size and development directions of existing blue ecotourism, its interactions with local economies, communities and ecologies, its environmental performance, and exemplars of international best practice in product development, quality assurance, and green certification. Definitions and measures of economic, ecological and other values and impacts, and interactions with other economic activities will need to be developed. Cultivating a new generation of blue ecotourism within an EBM framework and a cross-sectoral multi-benefit development agenda are exciting ways forward, which the Challenge has the capability to support. Alongside establishing measurement and best practices baselines, this project will support the development of EBM protocols, practices and regulatory regimes (government and private) for ecotourism. These will offer a starting point for the green accreditation, quality assurance and transformational shifts in practice foreshadowed by industry and government agencies. A new marine tourism founded on blue economy and EBM principles will provide for a recovery centred on diversity, resilience and high-value, low-impact, and ecologically and community-centred activities. This will support the Challenge to demonstrate the potential for EBM to underpin successful ecotourism development and foster transitions to a prosperous sustainability more broadly.
Research question(s)	*How can New Zealand grow ecotourism for a blue economy within an EBM framework?* The project will be conducted in two stages: Stage 1 – baselines, opportunities and challenges: 1. What baselines exist for identifying, categorising, measuring, certifying, and quality assuring marine ecotourism as a sector for development and how can these be implemented for a COVID-19 recovery (including actionable definitions, value propositions, sustainability and green certification initiatives, environmental dependencies and impacts, networks of interaction, international best practice, and Māori participation and leadership)? 2. What opportunities, aspirations, and innovations are emerging for a post-COVID-19 blue tourism that will grow ecotourism, connect it to other Blue Economy sectors, and encourage sustainable transitions within marine tourism more broadly? Stage 2: Building a new ecotourism for a blue economy 3. How can we enhance the potential of ecotourism activities at different scales and in different places (what EBM guidelines, tools, practices can be developed for managing sector development at relevant scales in a multi-use environment - including marine spatial planning; what green narratives and assurance and certification measures might these support; and what new cross-sectoral products might be developed)?

Research activities	Stage 1: Desktop document and secondary data analysis, interviews with key industry and agency informants: • Document, categorise, map and measure blue ecotourism in Aotearoa New Zealand and networks of interaction with wider tourism activities and other blue economy sectors, including regenerative tourism and Māori ecotourism initiatives. • Identify international best practice in ecotourism certification and quality assurance. • Identify blue ecotourism aspirations and areas of potential growth, new networks of interaction, and potential co-benefits among ecotourism and other blue economy sectors and identify barriers to growth and sustainability transitions (including ecological/environmental impacts). • Conduct PESTLE (Political, Economic, Social, Technological, Legal and Environmental) analysis of blue ecotourism opportunities. Stage 2: Case study analysis at sub-regional scale (2-3 blue ecotourism clusters e.g. Northland, Kaikoura, Whakaari, Hauraki Gulf): • Identify, document, measure and map emerging ecotourism value propositions, develop measures and assess ecological impacts, model community interactions and assess impacts, and identify potential cross-sectoral interactions. • Co-develop design indicators to measure progress against goals, secure certification, and develop tools to inform the indicators. • Apply categorisations, models and measures developed in Stage 1 and tools and indicators developed in case-study settings to co-develop EBM guidelines with Māori and stakeholders and trial EBM guidelines.
ToC Outputs	h. Guidelines developed, opportunities identified and innovations, for transitioning to a blue economy for businesses operating in the marine sector. i. Frameworks for decision making that consider multiple values and blue economy activities developed, evaluated and trialled. l. Remaining knowledge gaps that increase environmental risks of decision making are identified for iwi and stakeholders.
ToC Outcomes	1. The value of blue economy business models is recognised and adapted by Aotearoa New Zealand businesses. 2. Decision-making practices that are more inclusive, multi-sectorial and account for the effects from cumulative and multiple activities are adopted. 6. EBM practices are understood and accepted as a viable approach by decision makers, stakeholders and iwi.
Critical skills required	• Tourism research experience • Māori tourism • Tourism development strategy • Industry development analysis • Community development analysis • Ecological, community and economic impact analysis • NZ economic stats • Networks of interaction
Potential location(s)	National / multi-regional; Case study areas
Potential collaborations & co-development partners	NZTRI at AUT; DOC; Lincoln; Blue tourism operators (e.g. Whale Watch); community guardian organisations (e.g. Te Korowai in Kaikoura); Tourism New Zealand; MfE; PCE; Regional Economic Development Agencies; iwi organisations; New Zealand Māori Tourism (NZMT); Tourism Industry Aotearoa; Sustainable Business Network; Lincoln; Ngai Tahu Research Centre; University of Auckland; Market Economics; University of Otago; Deliberate
Links to and dependencies with other Themes / Tangaroa	Links to other core blue economy projects including the potential to connect/align case studies and research initiatives: 2.2 (eco-tourism as multi-benefit of restoration economy investment); 2.3 (Māori investment, management models) Links to 3.2 (which needs to include ability to assess business risks and uncertainties); 1.1 (assessment of ecological footprints, understanding Cumulative Effects); and 1.2 (tools for spatial planning and maintaining systems capacities); 4.3 (applied example of EBM and kaitiakitanga)
Timing	Stage 1 (July 2020-December 2021); Stage 2 (January 2021-June 2023)
Building on which Phase I research	Whai Rawa, Whai Mana, Whai Oranga: the Māori marine economy. New blue economy in Kaikōura: participatory process approach. Creating value from a blue economy.

Project title	2.5 Building a seaweed sector for a blue economy
Problem definition	In recent years, there has been significant domestic and international interest in the potential for seaweeds to provide a wide range of food, feed supplement, and pharmaceutical and nutraceutical products, as well as to address methane emission, ecosystem restoration, and carbon sequestration. To date, these investigations look promising and iwi involvement is high. The seaweed sector is poised for take-off, but there are multiple and disparate visions, significant uncertainty about market, regulatory and ecological implications of investment decisions, and significant risks that national benefits will not be fully realised and ecological harm will be done. The investment and research landscapes are crowded and fragmented. Opportunities are being identified in aquaculture, ecosystem restoration, climate change alleviation, and community economies (e.g. Greenwave). Different models of development for the seaweed sector are being considered, including different mixes of species, size of enterprise, regional location, product type (seafood, bioactives, fertiliser, ecosystem services, etc.), and business model (volume v. high value, in-shore v. offshore, farmed v. wild-harvest, monoculture v. multi-trophic, etc.). There are significant ecological risks associated with making narrowly focused investment decisions, which may have damaging, unintended consequences for established and future enterprises as well as communities and natural environments. However, levels of coordination are currently limited across ecological and business knowledge and across decision-making scales. There is a need to assess cumulative effects, risks and opportunities; and to identify regulatory requirements and decision-making guidelines for managing ecological impacts and multi-use contests. There is an opportunity for the Challenge to encourage and inform a coordinated blue economy approach to the seaweed sector that will enhance opportunities, minimise mistakes, and enable marine spatial planning solutions that allow for blue economy development that generates multiple co-benefits at different scales for a range of enterprises. The project offers a rare opportunity to help develop an EBM framework and associated measures, guidelines and protocols in a new blue economy sector rather than seeking to retrofit an EBM approach to existing activities. This will allow for demonstrating the economic and other values of an EBM approach. In a crowded and fast-moving landscape, the Challenge will need to coordinate closely with industry and government agencies through co-development processes to ensure that it fills gaps and avoids duplication of efforts.
Research question(s)	*How do we enable an EBM framework for a successful seaweed sector?* This project will take place in two stages. Stage 1 research will lay the ground for Stage 2, which is designed to involve working alongside businesses, Māori and stakeholders, as they build business models and regulatory frameworks. Stage 1: 1. What does the seaweed development landscape (domestically and internationally) look like in terms of science, investment, and regulation across different products and along value chains from production and harvesting techniques to establishing markets - who is doing (and looking to do) what, what is known, and what are the uncertainties and associated risks? 2. What are the economic, ecological/climate, community and associated business opportunities, risks, barriers/enablers and rewards of different business and regulatory models for sector development in New Zealand? Stage 2: • What EBM solutions exist for managing sector development (including kaitiakitanga and marine spatial planning), what benefits (economic/ecological) do they offer, and how can they best accommodate different opportunities for different enterprises at different scales, including Māori blue economy? • What kind of EBM framework and guidelines can be co-developed with Māori and stakeholders at an appropriate scale?

Research activities	Stage 1: • Mapping investment, market, regulatory, science and ecological landscapes – collating existing knowledge, and identifying and analysing opportunities and risks. • Qualitative research with domestic seaweed enterprises, potential investors, agencies (MBIE, MPI, MfE, DOC, Regional Councils), Māori and communities to identify visions, barriers and prospective investment models and interactions along and across different value chains. Stage 2: • Building and trialling an EBM framework and guidelines for seaweed development at a regional and sub-regional scale (identifying, measuring, and modelling economic, social and ecological opportunities, costs and benefits, co-developing options); 1-2 regional/sub-regional case studies (e.g. Hauraki Gulf, Southland, Opotiki). • Establishing a value network model for seaweed to support investors and decision makers.
ToC Outputs	d. Decision-making processes that recognise risk and uncertainty evaluated, developed, and demonstrated. h. Guidelines developed, opportunities identified and innovations, for transitioning to a blue economy for businesses operating in the marine sector. i. Frameworks for decision making that consider multiple values and blue economy activities developed, evaluated and trialled. l. Remaining knowledge gaps that increase environmental risks of decision making are identified for iwi and stakeholders.
ToC Outcomes	1. The value of blue economy business models is recognised and adapted by Aotearoa New Zealand businesses. 2. Decision-making practices that are more inclusive, multi-sectorial and account for the effects from cumulative and multiple activities are adopted. 6. EBM practices are understood and accepted as a viable approach by decision makers, stakeholders and iwi.
Critical skills required	• Breadth of industry knowledge (investment and market analysis) • PESTLE/SWAT analysis • Value network analysis • Regulatory knowledge • Seaweed science – incl. bioactive potential • Marine ecology • EBM approaches, guidelines • Ecosystem services valuation and modelling • Qualitative research techniques (interviewing, discourse analysis) • Mātauranga Māori
Potential location(s)	National and sub-regional cases (e.g. Hauraki Gulf, Southland, Opotiki) to be decided with co-development partners
Potential collaborations & co-development partners	Aquaculture NZ; enterprise leaders (e.g. AgriSea, Wakame Futures, Whakatōhea Mussels / Eastern Sea Farms, Sanford, Southern Clams Ltd, Ngai Tahu Holdings, Natural Kelp, Wakatū Incorporation); EnviroStrat; blue-tech firms (including commercialisers of bioactives); Iwi Collective Partnership and Te Ohu Kaimoana; MfE; DOC; MPI, NZTE, Regional Councils; seaweed science programmes (University of Waikato; Cawthron; University of Auckland; AUT; University of Canterbury / Ngai Tahu Research); Statistics NZ; hapū and whanau (through Tangaroa project leaders); NGOs (e.g. Nature Conservancy Trust); NIWA
Links to and dependencies with other Themes / Tangaroa	Links to other core blue economy projects including the potential to connect/align case studies and research initiatives: 2.3 (Māori investment, management models), 2.2 (carbon sequestration, ecosystem services, estuarine restoration, multi-trophic initiatives) Links to projects in other themes 3.2 (which needs to include ability to assess business risks and uncertainties); 1.1 (assessment of ecological footprints, understanding CE); and 1.2 (tools for spatial planning and maintaining systems capacities); 4.3 (applied example of EBM and kaitiakitanga); T1: Awhi Mai Awhi Atu (policies and tools for marine restoration economies; T2: Huatuakina o hapū e (integrating kaitiakitanga and EBM in management of seaweed farming, harvesting and gathering)
Timing	Stage 1: July 2020-June 2021; Stage 2 January 2021-June 2022
Building on which Phase I research	Whai Rawa, Whai Mana, Whai Oranga: the Māori marine economy. Creating value from a blue economy.