National SCIENCE Challenges

SUSTAINABLE SEAS

Ko ngā moana whakauka

Creating value from a blue economy

Lewis N, Le Heron R, Hikuroa D, Le Heron E, Davies K, FitzHerbert S, James G, Wynd D, McLellan G, Dowell A, Petersen I, Barrett J, Sharp E, Ribeiro R, Catley S, Baldoni M and Le Heron K

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Report

Final report for Sustainable Seas National Science Challenge project
Creating value from a blue economy (Valuable Seas 2.2.1)

Report authors

Lewis N, Le Heron R, Hikuroa D, Le Heron E, Davies K, FitzHerbert S, James G, Wynd D, McLellan G, Dowell A, Petersen I, Barrett J, Sharp E, Ribeiro R, Catley S, Baldoni M and Le Heron K.

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More information on this project, visit www.sustainableseaschallenge.co.nz/our-research/creating-value-from-a-blue-economy

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THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tāmaki Makaurau NEW ZEALAND

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The views contained within this Report are, of course, our own.

Nicolas Lewis

Project Leader

1. Objective and purpose

This Report presents the findings of Phase 1 of the *Creating Value from a Blue Economy* (CVBE) project funded by the Aotearoa New Zealand Sustainable Seas National Science Challenge (SSNSC). The Challenge objective is to:

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

Its 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".*

The CVBE project aimed to advance this mission and support the Challenge to deliver on its objective by investigating approaches to creating value in a blue economy.

The project played a significant role in Phase I of the National Science Challenge. It developed ideas of blue economy within the Challenge, its stakeholder groups and the wider public. It was given the role of extending understanding of marine economy and disrupting the established view of economy as existing in a fundamental antagonism with the environment.

It was effectively asked to build and inform a discourse of the blue economy in Aotearoa New Zealand at a time when other nations and international agencies were developing policy in this realm. And it was given a mandate from the National Science Challenge process *to develop a long-term research agenda, target issues that matter to all New Zealanders and disrupt business as usual in knowledge production.*

The research in CVBE supported the Challenge to adopt the discourse of a blue economy as a platform for achieving its objective and realising its vision of 'healthy marine ecosystems that provide value for every New Zealander'. The research supported Sustainable Seas to define a blue economy in open and aspirational terms as one that will '*generate economic value and contribute positively to social, cultural and ecological wellbeing*'.

The idea of *blue economy* has allowed the Challenge to develop its understanding that *enhancing utilisation of marine resources* in terms of its mission means more than achieving economic growth by standard measures.

2. Executive Summary of key Findings and Recommendations

The CVBE project took up the National Science Challenge mandate to disrupt business as usual. It scoped out what it would take to transition to a truly blue economy that will put New Zealand at the forefront of global change.

The information gathered, observations made, and insights drawn demonstrate that:

- Aotearoa New Zealand's *marine economies are more complicated than is recognised* through standard measurement approaches
- Aotearoa New Zealand enterprises have *begun to embrace new aspirations and commitments*, adopt new (green) technologies, and develop new sectors
- Key *barriers to enhancing resource use are resource management and knowledge-based* as much as they are a result of investment or market development constraints
- *Government agencies are committing to EBM approaches*, but government and formal industry perspectives remain dominated by export-led growth strategies and targets that lock-in volume-based business models and limit commitments to other values
- *There are opportunities for creating new and different blue economy value(s*), business models, production practices and ethical coordinates that dovetail with value-added strategies
- *Māori economy is leading the way* towards a blue economy in the terms of Te Ao Māori, by demanding a fuller exposition of values and possibilities, asking who benefits and how, embracing collecting initiatives, and configuring values-means-ends pathways differently

In short, the project demonstrates that Aotearoa New Zealand has the potential to generate a unique and world leading blue economy that generates national income gains through a focus on livelihoods, community values and ecosystem health. To succeed, *these goals need to be understood as fundamental* rather than as limits to growth. Success will secure sustainable seas for multiple generations to come.

To achieve this outcome will require altered practice and management from investment and entrepreneurialism to routine production and resource management practices, and to altered public values and consumer behaviour. It will also require altered management and governance regimes, which will need to be fully integrated into a fundamental rethinking of the economy, its potential and its purpose.

Aotearoa New Zealand will need to:

- embrace a holistic understanding of economy that encompasses all activities and all actors involved in economic processes

- adopt new ways of identifying and measuring economic activity that recognise enterprise level activities and connectivities and present objects of management that facilitate transitions and allow for sharper policy objectives
- achieve successful and on-going technological transitions to more sustainable production practices across all sectors
- refocus attention on adding value(s) in all economic activities and fields – from conception to resourcing to measuring returns
- recalibrate with blue economy principles all circuits of economic activity from entrepreneurialism to investment, engagement with nature, production, distribution, consumption and regulation, including focusing attention on green finance, restorative economy, and provenance values
- develop environmental and economic management frameworks that are (a) aligned around the recognition that in resource economies economic and environmental management are effectively the same process focused on different objects of management; (b) adopt the principles of ecosystem based management as a platform for community and ecosystem health; and (c) embed commitments to just transitions
- recognise the virtues of the commons as a platform for delivering just transitions

These are radical means to achieve ambitious goals at a time when the world requires (and is demanding) a sea-change in marine economy. Aotearoa New Zealand is uniquely placed to lead the charge, has a responsibility to do so, and will be a winner if it succeeds. The triadic pressures of climate change, Covid-19 epidemic and geopolitical upheaval will change the world, New Zealand's place in it, and our economic opportunity sets. The potential gains for the nation of doing blue economy well are beyond measure.

These findings pose hard questions which pivot around who should be allowed to shape and drive blue economy futures and for whom, and what it will take to ensure that they can. The research does not answer all the questions it poses, but it does identify strategies, frameworks, and processes that will.

The research frames the fundamental economic questions facing Aotearoa as political: access to aquaculture space for growth, science spending to support blue tech, commitments to distinctiveness and value-added products, and commitments to high value tourism and indigenising environmental management and economic activity. It identifies levers that promise to put transitions in motion.

The conceptualisation of economy developed in this report will be unfamiliar, but the emphasis it places on economy should reassure business interests and related stakeholders that economy remains central to questions of local and global futures.

Imagining the possibilities of a BE is not an abstract intellectual exercise; it is an economic imperative for a country increasingly dependent on marine and coastal resources for income

and environmental safety. Transitioning to a blue economy is essential but will not happen by itself. And it needs to be brought about by a new alliance of interests and commitments to collective benefits, which will involve existing metrics of economic success but reframed within and accountable to wider ecological, cultural and social metrics,

Utilising marine resources is about more than growth per se and sustainable futures must be about more than growth within limits. The economy that delivers them must be understood as more than an external object of 'management' the boundaries of which are defined by outmoded measurement regimes. Rather economic success is a question of kaitiakitanga.

The report will argue that in the context of Te Tiriti o Waitangi and the significance of Māori economy in Aotearoa New Zealand's marine economy, transitions to a blue economy might best be understood as *indigenising marine economy*. It concludes by identifying five spheres of action for operationalising just transitions to a blue economy – each of which recognises and seeks to strengthen the generative potential of the commons:

- *extending the oceanic conservation estate* to allow for more creative and flexible spaces of allowable practices
- developing an institutional framework that secures *a place-oriented, practice-based, and opportunities-focused to managing economy-environment relations* that delivers just transitions and EBM principles
- centring concerns with *indigenising blue economy* as a unique opportunity and development model for achieving blue economy environmental, livelihood and social justice goals
- adopting *a national strategy for the blue economy and an Oceans Ministry* to promote and secure transitions
- *targeted research* to support these blue economy development directions

3. Introduction and outline

CVBE explored the creation of value in a blue economy in Aotearoa New Zealand. This require interpreting what is meant by a blue economy in this context, how the idea of a blue economy reinvents the notion of value, and what opportunities exist for creating new blue economy values in Aotearoa New Zealand. The research focused on:

- Defining what a blue economy means for Aotearoa New Zealand and working with economic actors (enterprises, publics, and government agencies) to ensure that its opportunities are recognised and realised
- Ensuring that blue economy considerations are incorporated into models of ecosystem-based management
- Identifying sites and possibilities for transitions to a blue economy
- Identifying and supporting regional development initiatives to foster regional blue economies and develop their potential
- Highlighting specific enterprise-level production and investment practices that are helping to bring about a blue economy.

3.1. The need to rethink economy here and now

The research was premised on the need to recognise different sources of value, create economic value differently, and identify new sources of economic value creation from sustainable marine practices and activities. It was guided by the disruptive mandate of the Challenge, the Challenge mission and multiple pressures from multiple sources to find new ways of generating economic and social values from environmental resources.

As we started the project, local and international commentators had begun to call for a new economics in the face of rising global inequality, climate change, environmental degradation, and the impacts of failures to distribute economic gains at all scales (Earle et al. 2017; Raworth 2018). By the completion of the project Covid-19 and global geopolitical insecurity had added new pressures and significance to the challenge of doing economy differently.

Rethinking such as that implied by the idea of blue economy is a crucial starting point. Our frameworks for understanding and managing resource economies need to reflect this rethinking, as do our aspirations to create new values. We need to think and do differently in marine spaces.

We start this rethinking with the observation that the creation of multiple values (cultural, social and spiritual, and environmental as well as economic) is central to any vision of economy, and that the knowledge required to do this lies in the social sciences (McKinley *et al.* 2020). And we ground our thinking in three disruptive conceptual foundations that allow us to bring blue economy thinking to existing marine economies in Aotearoa New Zealand to plot ways forward:

- economy can be understood as the processes and practices that steward and organise resources to support and secure livelihoods inter-generationally (Mitchell 1998)[1]
- economies in practice comprise a diversity of individual and collective (nations, regions, communities, iwi, hapū and whānau) actors, actions and interests - they do not reduce to the actions of businesses and consumers in markets
- economies are made (they do not emerge spontaneously) - we need to recognise this more explicitly, understand how they are made, and think about the possibilities of remaking them for the benefit of social collectives, including natural entities

In a more applied sense, we build on (1) the current value creation priorities and obstacles revealed to us through our research; and (2) the core concept of 'resourcefulness'.

3.1.1. Value creation priorities

Our research involved extensive conversations and interviews with proprietors, executives, employees, and regulatory agencies across multiple sectors of the marine economy (formal interviews, workshops, and informal engagements).

These conversations and other blue economy research funded within the challenge convinced us that for most, the crucial short-medium concern does not lie with market penetration, market development or international competition. Figure 1 outlines the concerns expressed in different sectors.

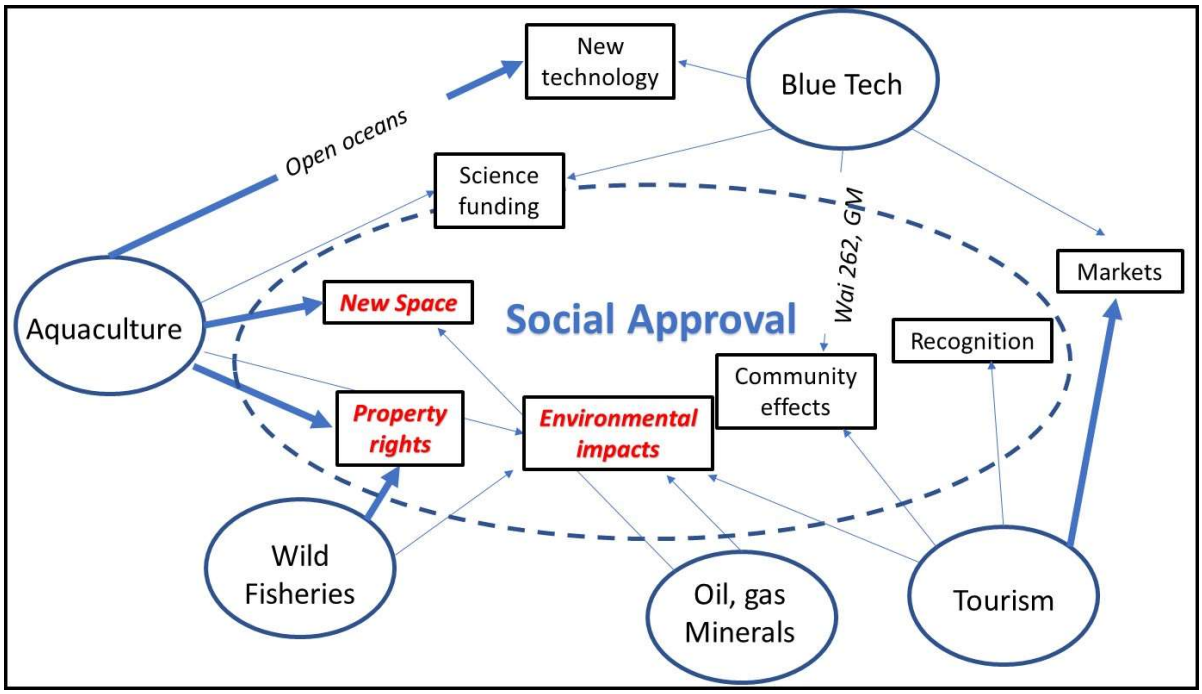
Other than the Covid challenge posed to international tourism and spill-over effects to the restaurant trade for seafood, the key sectors from which we expect to see the most significant growth over the next period face defining challenges beyond the market. These challenges include new technology development, environmental impacts of operations, security of property rights, and access to ocean space for development. In short, a blue economy future lies in the hands of government funding and the regulation of environment-community-economy relations.

Commonly expressed by business stakeholders as achieving clarity and stability in the regulatory environment, the critical question at the heart of creating new value in a successful blue economy can be understood as *social approval, mandate, support, and commitment.* Access to space and property rights, government science funding, and environmental

[1] In this report, we routinely use the term 'economy' without a definite article to refer to action and actors whom we do not directly specify; 'the economy' to refer to a configuration on the ground of businesses, networks, supply chains, investment processes, markets, and economic actors (workers, investors, entrepreneurs, government agencies, producers, researchers, supermarkets, eaters, retailers, and so on); and 'an economy' to refer to a possible and as yet not materialised set of these actors, resources and relations.

performance constraints are intimately connected to meeting/exceeding public expectations in the marine commons. Success is contingent on collective assets, collective effort, and collective concern.

Figure 1: Key sites of possibility for new value creation in blue economy



The observation is pivotal to this report and to where the CVBE project ultimately landed in recommending new approaches to structuring environment-economy relations in order to facilitate novel initiatives.

3.1.2. Core concepts

The observations underlying Figure 1 align with our interpretation of *economy as stewarding resources for livelihood and social reproduction* and the corollary that *economic values include cultural, social and the environmental values appreciated by humans* ie creating value must always mean creating multiple values. As a consequence, the *relations between values and economy, economy and management, and environmental and economic well-being are co-constitutive and far from intrinsically antagonistic relationships.*

We stress that (1) generating a more helpful regulatory environment does not have to mean less, more distant, more universal, or more rigid regulation; and (2) that social approval does not mean social licence as it is often understood (ie permission to act freely within limits). Rather, improved economy-environment relations and their management mean negotiating social approval in the context of specific actions in uneven and changing contexts.

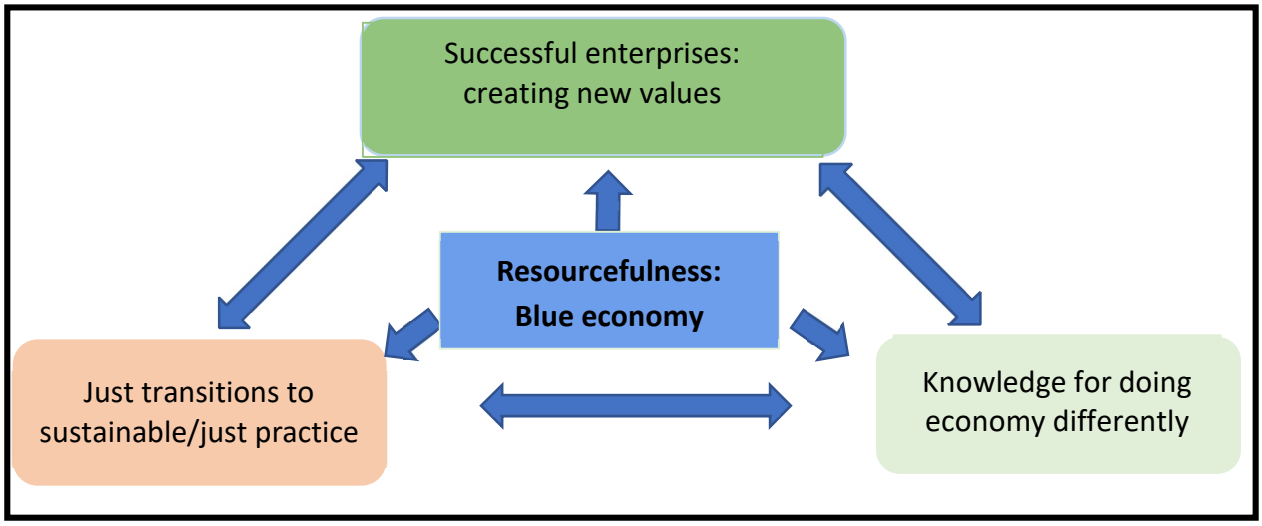
The concept of 'resourcefulness' is useful here. It extends the idea of resources as intrinsic qualities to a more complicated notion of:

> *collective capability and will at various scales to assemble and make use of social and natural entities and processes to deliver livelihoods, reproduce social life, and sustain healthy natural environments*

The idea of 'blue economy' represents an exciting platform for building resourcefulness.

The rationale and guiding structure for the CVBE project is captured in Figure 2, which positions blue economy thinking at the centre of a virtuous circle of novel thought and knowledge production (science, debate, participation of communities of interest, economic analysis, new ethics and politics), sustainability transitions, and the successful creation of new value(s).

Figure 2: Creating value from a Blue Economy



3.2. Research approach and data sources

The CVBE project aimed to:

- map different types of blue economy in Aotearoa New Zealand
- identify experimentation with practices that might encourage transitioning possibilities
- stimulate ideas for a sea-change in Aotearoa New Zealand's marine economy by revealing the possibilities for new value creation and emerging trajectories towards a blue economy

This report outlines how it has met those objectives through research that draws on:

- analysis of 52 diverse marine economy enterprises – 26 semi-structured interviews completed by the research team; interview and web-based analysis of 7 enterprises drawn from student-supported projects; and analysis of publicly available media and other accounts of a further 19 enterprises
- 14 semi-structured interviews and roundtable conversations with economic development and environmental management in five regions involving a total of 30 local and regional government officials
- four semi-structured interviews with central government officials
- two blue economy workshops involving CVBE researchers and a total of 32 stakeholders, and one Strategic Innovation Priorities workshop co-hosted with the Ministry of Primary Industries (MPI)
- two seminar-centred half-day workshops involving regional government officials with blue economy responsibilities
- participation in four workshops organised by other Valuable Seas projects, where CVBE researchers workshopped blue economy ideas with business stakeholders and regional and central government agencies
- participation in a Te Tau Ihu Intergenerational Strategy workshop hosted by Wakatū
- a three-day social values 'hikoi' funded by CVBE involving iwi, international researchers, and Challenge researchers
- participation in interviews and access to notes from interviews conducted as part of the Phase I-Phase II 'Transitioning to a Blue Economy' project (EnviroStrat 2019)
- two round table discussions with Nelson based BE stakeholders
- databases and models produced by research commissioned as part of CVBE (Connolly & Lewis, 2019; Yeoman, Fairgray, & Lin, 2019)
- student summer research projects, field research courses, and research assistantships for Masters' and PhD students (Petersen 2020; Dowell 2019, 2020; Barrett 2019a; McLellan 2020; Sharp 2019, 2020; Baldoni 2017; Catley 2017)

Insights and data were also gathered from the CVBE-funded participation of research team members in aligned initiatives led by other Sustainable Seas research project teams, including participation in:

- Our Seas project: *Development of valuation frameworks and principles* (Lewis) (Sinner, et al., 2020; Šunde et al. 2018; Tadaki et al. 2020)
- Blue Economy Phase II project: *Transitioning to a Blue Economy* (Lewis) (Envirostrat 2019)
- EBM-enabling narratives for New Zealand (Lewis) (time, resources, interviewing) (Le Heron E. et al. 2019; Le Heron, E. et al. 2020; see https://www.sustainableseaschallenge.co.nz/tools-and-resources/generating-a-blue-economy-through-ebm/)

- multiple workshops and meetings funded as part of Valuable Seas and Managed Seas (Lewis), including CP2.1 Piloting the use of systems mapping (Connolly and Lewis 2019)

The Report also builds on data and insights derived from projects in which members of the CVBE team participated as team members of other sustainable Seas research teams.

- '*Testing EBM supportive processes in multi-use marine environments'*, including documentary analysis of 19 participatory processes that had arisen since 2000 in the country's marine spaces (Le Heron, Le Heron, Hikuroa) (Le Heron et al. 2019; Le Heron E. et al. 2020)
- Creating a Blue Economy in Kaikoura (Lewis et al. 2020a, 2020 b)) (Lewis, Le Heron, Hikuroa, & Le Heron, 2020)
- "Whai Rawa, Whai Mana, Whai Oranga": Creating a world-leading indigenous blue economy, including insights into key Māori economy enterprises and the ethical co-ordinates of Māori business (Hikuroa)) (Rout, et al., 2019; Reid, Rout, & Mika, 2019)
- Frameworks for achieving and maintaining social licence (Lewis) (Newton et al. 2019; Sinner et al. 2020)
- Cumulative effects (Davies et al. 2020, 2018)

The CVBE team was instrumental in cross-fertilising other projects by contributing researcher time and intellectual resources, from which it in turn benefitted by enhancing the database and insights from which it was able to draw. Most significantly, the experience enabled the team to refocus on the full diversity of economic practices and actors from business enterprises to regulators and providers of research and development

The research also drew on a growing academic and secondary literature on Aotearoa New Zealand's marine economy beyond the Challenge itself.

3.3. Outline

This report proceeds in a series of steps. First, we examine what we term the blue economy moment and how a proliferating discourse at the international level has begun to attach to thinking about marine futures in Aotearoa New Zealand. We introduce the idea of the blue economy as an aspiration - a 'new narrative' that promises healthy and productive oceans and sustainable marine livelihoods (Lubchenco & Gaines 2019; Lunchenco et al. 2020; Jouffray et al. 2020).

Second, we outline the complexity of existing marine economy that is rarely captured by mainstream accounts and is either glossed over or siloed into independent conversations about economy, management, governance, and social change. We present findings that show the

level of connectivity that lies behind standard political discussions at sector scales. We also highlight some of the activities that indicate change towards a blue economy at the enterprise scale. This allows us to argue that even in the terms of established measures, we need to emphasise new activities.

Third, we outline the full range of actors involved in marine economy. This allows us to portray the economy as a set of relations in which investment, production, distribution and consumption are tightly entangled in regulation, politics, scientific knowledge, community interest.

Fourth, we develop a model of blue economy at the practice scale that allows us to aggregate economic activities into unfamiliar categories for management. We identify six broad and overlapping marine sub-economies (Māori, blue-tech, commodity, community, foundational and distinctiveness) and investigate connections among them.

Fifth, we develop a critique of existing environmental management and argue for the need to embrace EBM and just transitions as foundations for creating value in a blue economy.

Finally, we present a broad model for national blue economy development that might be used as a basis for rethinking more specific region and sector planning. The model we develop is designed to identify high-order objects of management that will help guide policy and broad business models, and in turn connect to enterprise and community scale interests, a focus on opportunities, and practice in place. It highlights the possibilities of achieving a sea change in marine economy inherent in indigenising existing economy.

The Report concludes by advocating for a defining shift to indigenising our marine economies as a platform for producing a distinctive value creating blue economy in Aotearoa New Zealand. It points to how this and its other recommendations have been picked up in Phase II research within the Challenge, which will generate some of the specific scientific and business knowledge necessary to activate a new opportunities-led blue economy. In this sense it positions CVBE as *leading a transition to blue economy, which will be driven through the Phase II projects*.

The report is guided by findings that show transitions to a blue economy to be underway at both the enterprise and social movement levels. It thinks through how to connect these initiatives. involve far more than sustainable technologies for commodity production.

4. Exploring Blue Economy

National governments, international governance bodies, policy agencies, investment funds, and international banks have directed attention to the oceans as a potential source of economic growth and food and mineral resources. The term Blue Economy has become widely used internationally (Winder and Le Heron 2017a, 2017b).

With millions of people dependent on the sea for a living, oceanic environments already under significant pressure from human abuse, environmental politics increasingly prominent, and the historical record of social and environmental justice in developing resource frontiers so poor, the vision of the oceans as a new resource economy frontier is deeply problematic (Lubchenco et al. 2020; Jouffray et al. 2020). Concerns about climate change and its complex relationships with the oceans only intensify these sensitivities.

For those interested in the future of the oceans, the idea of a blue economy has provided a new language in which many different constituencies can join a debate about sustainable development (Silver et al. 2015; Winder and Le Heron 2017; Garland et al. 2018; Voyer et al. 2018). In short, blue economy thinking focuses attention on the ecological vulnerability of the oceans and the fates of coastal communities as well as their resourcefulness (Lewis 2019). Any promise of economic growth is couched in terms of advanced and clean technology, long-term environmental sustainability and concerns with environmental degradation and biodiversity.

4.1. A Blue Economy perspective in the world

The idea of a BE has generated intense international interest. It has found its way into high-level policy and strategy documents for international bodies and countries as diverse as Chile, India, Bangladesh, Canada and Kenya, yet there is no generally agreed definition.

The World Bank has launched a US$5.6 billion Blue Economy programme[2] focused on:

- managing sustainable fisheries and aquaculture
- addressing threats posed to ocean health by marine pollution, including litter and plastics, from marine or land-based sources
- sustainable development of key oceanic sectors such as tourism, maritime transport and offshore renewable energy
- building government capacity to manage marine resources, including nature-based infrastructure such as mangroves
- positive environmental and economic outcomes that deliver *the UN Sustainable Development Goals (SDGs)*

[2] https://www.worldbank.org/en/programs/problue/overview.

The OECD is primarily concerned that the ocean's deteriorating health is a "constraint" on the "future growth" of ocean-based industries. It regards the oceans as "the new economic frontier" (OECD, 2016).

The European Commission is also fundamentally interested in the economic possibilities locked into the oceans, and to dealing with the problem that "*the healthier [seas and oceans] are, the more productive they'll be*."

Many of these concerns are consolidated into an account of trajectories of change by The Economist Intelligence Unit (Table 1), which *emphasises the possibilities associated with sustainable activities in thinking into the future.* The Table is important as it highlights a future economy made up of a suite of more sustainable and technologically driven economic practices. The Table indicates key trajectories and dynamics and foreshadows the CVBE interpretation of blue economy as aspiration.

Table 1. Components of the ocean economy

Type of activity	Ocean service	Established industries	Emerging industries	New industries	Drivers of future growth
Harvesting of living resources	Seafood	Fisheries	Sustainable fisheries		Food security
			Aquaculture	Multi-species aquaculture	Demand for protein
	Marine bio-technology		Pharmaceuticals, chemicals		R&D in healthcare and industry
Extraction of non-living resources, generation of new resources	Minerals	Seabed mining			Demand for minerals
			Deep seabed mining		
	Energy	Oil and gas			Demand for alternative energy sources
			Renewables		
	Fresh water		Desalination		Freshwater shortages
Commerce and trade in and around the ocean	Transport and trade	Shipping			Growth in seaborne trade
		Port infrastructure and services			International regulations
	Tourism and recreation	Tourism			Growth of global tourism
		Coastal development			Coastal urbanisation
			Eco-tourism		Domestic regulations
Response to ocean health challenges	Ocean monitoring and surveillance		Technology and R&D		R&D in ocean technologies
	Carbon sequestration		Blue carbon (i.e. coastal vegetated habitats)		Growth in coastal and ocean protection and conservation activities
	Coastal protection		Habitat protection, restoration		
	Waste disposal			Assimilation of nutrients, solid waste	

Source: EIU 2015:6

The United Nations shares a similar perspective on the blue economy but connects its development directly to the SDGs (United Nations Development Program, 2020). In this view, *growth on its own is not enough. It* ***must not*** *come in a context where the beneficiaries are limited to those in advanced nations, global inequalities are reproduced, small coastal communities do not benefit, the environment is damaged, and future generations bear the*

costs. The thrust in these accounts is directed to *community economies and securing the ocean commons for local livelihoods*.

The WWF – along with other environmental advocates – aims to leverage this interest in BE to promote its sustainability agenda.[3] WWF moves beyond sustainable fishing and aquaculture and abstract ideas of 'healthy' seas to *promote an economy that restores, protects and maintains resilient ecosystems*. For environmental advocates, the commitment to a genuinely BE must be matched by action.

Small island nations are also taking up BE perspectives in relation to World Bank or UN Development initiatives. Approximately 50 small island states have the potential for significant growth and development through development of their ocean resources. Presently most are poorly equipped to develop their own industries or police their ocean borders.[4] As a result, their fish stocks run the risk of being depleted through overfishing by larger, economically dominant nations, especially in the Pacific.

Small island states have a particular interest in the sustainability aspects of a BE as they are also on the front line of rising sea levels brought about by climate change. These nations emphasise the value of future income as well as local livelihoods and their dependence on ecosystem health. In both senses they *emphasise the challenges of exercising sovereignty over their oceans to ensure local futures*.

Close to home, Australia has made progress on a BE, recognising growing consumer demand for sustainable seafood, environmental sustainability, as well as conflict between the interests of stakeholders.[5]

Australia produced a 10-year National Marine Science Plan in 2015 with specific (mostly economic) targets including a contribution to emissions reduction targets. This Plan (see Figure 3) was released at the time that Aotearoa New Zealand was developing its blue economy narrative through the Challenge.

The Australian approach is helpful as it illustrates how *marine economy sectors operate within a web of local and central government regulations, implied political agendas, economic and social imperatives and associated constraints, and the physical and biological dynamics of their location*. The model places new knowledge at the core of blue economy development strategy and local and global social and environmental challenges at the heart of strategic objectives.

[3] https://www.wwf.eu/what_we_do/oceans/promoting_a_sustainable_blue_economy/.
[4] https://www.unenvironment.org/nairobiconvention/news/story/blue-economy-new-frontier-small-island-developing-states.
[5] https://blueeconomycrc.com.au/about/.

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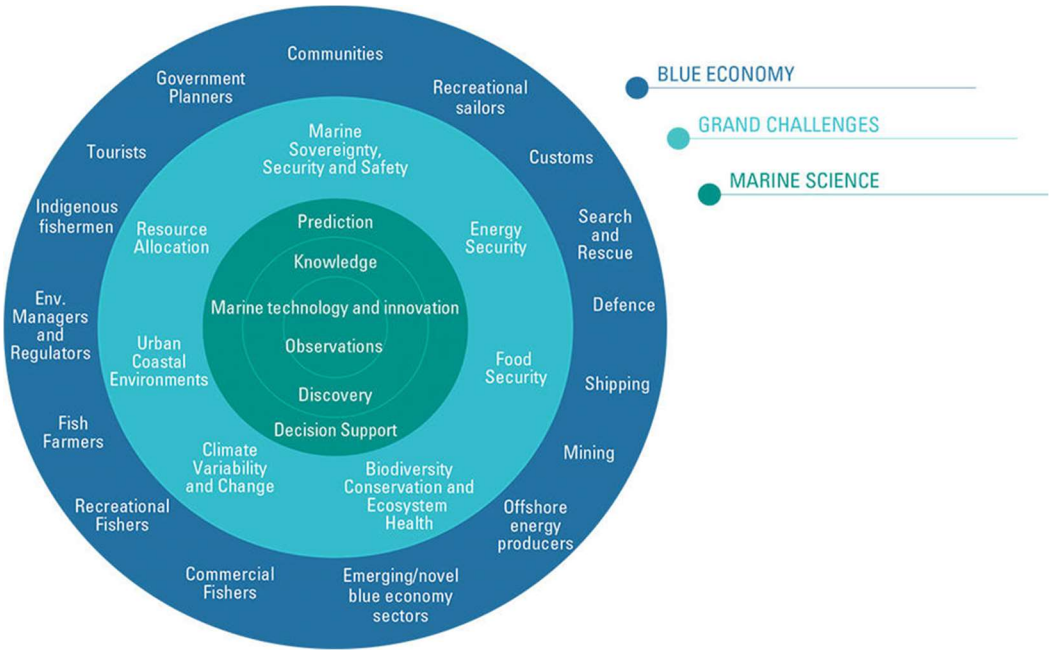
3: An Australian Blue Economy



Source: Australian Marine Science Committee (2015) (https://www.marinescience.net.au/wp-content/uploads/2018/06/National-Marine-Science-Plan.pdf) p.25

While in practice the programme has privileged large scale aquaculture and mining[6] alongside renewable energy rather than the wider environmental and social elements prefigured in this diagram, Figure 3 *presents three key messages for New Zealand*:

- the value of adopting a broader conception of BE centred on identifying and classifying the types of activities in marine economies, and identifying the types of enterprises and social groups drawing on marine resources (and what they do)
- an explicit commitment to science and innovation
- a clear recognition of the way that development opportunities are shaped by regulatory conditions, resource allocation/distribution, ecosystem health and the major global challenges facing humanity and society

In short, the doughnut representation focuses attention on *a blue economy ecosystem and the human and non-human entities involved at multiple scales*, rather than a commercialisation pathway focused on sectors that sees management and regulation as either a barrier or a necessary support for business. Our research starts at the same point.

[6] See https://www.marinescience.net.au/

4.2. Premises of a Blue Economy

While definitions and focus differ with the nature of the agency and geographical context, international agencies, practitioners, and academics in the field generally agree on a set of underlying premises (see, for example, Hoegh-Guldberg et al. 2019):

- societies must look to the oceans to secure their food, energy and wider economic futures
- oceans offer enormous opportunities for economic development
- identifying these opportunities will require significant investment in new knowledge;
- realising these opportunities will require creative environmental management that recognises the values of the commons and the claims, cultures and livelihoods of coastal communities
- growth must involve a fundamental transition to ecologically and socially sustainable economic activities, which will not happen by itself and will require active intervention

For 'The Economist' (The Economist Intelligence Unit, 2015), realising such a vision will take institutional support for a balanced approach to the governance of ocean space. A clear policy and planning framework will be essential, but not sufficient. The Economist calls for reform of governance institutions, better economic data and science (to give confidence in the metrics), and innovative finance to generate investment into activities that will enhance ocean health.

This reframing of the future of oceanic and coastal economy is overdue, even as critics contest just how seriously its advocates embrace the call for transitions that focus on socio-cultural and environmental wellbeing. This reframing of the future of oceanic and coastal economy is overdue, even as critics suggests that the call for transitions must go considerably further (Morrissey and Heidkamp 2017; Heidkamp and Morrissey 2018; Lubchenco et al. 2020; Hoegh-Guldberg et al. 2019).

4.3. Blue Economy Thinking in Aotearoa New Zealand

Aotearoa New Zealand has yet to address the concept of blue economy formally in legislative or policy terms. It has yet to recognise the importance of the sea change in approach that blue economy thinking demands and adopt appropriate measures to manage its marine economy in blue economy terms. Sustainable Seas, however, is leading the way.

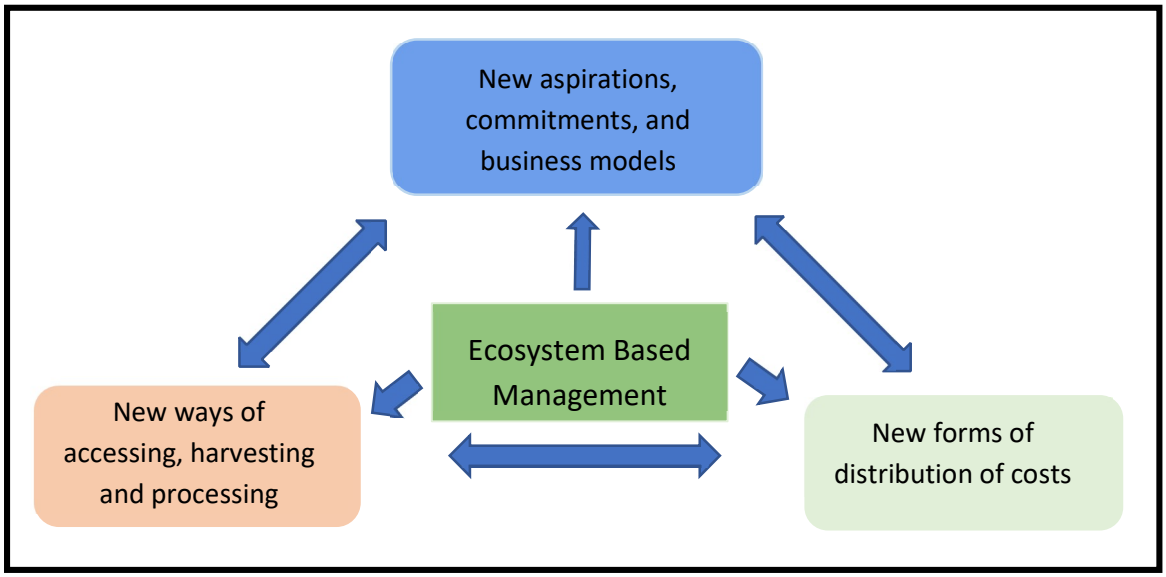
The five premises of blue economy can be applied to stimulate BE thinking in Aotearoa New Zealand. We use them to advance a set of propositions for addressing the challenge of enhancing the utilisation of marine resources in Aotearoa New Zealand (Sustainable Seas National Science Challenge, 2020):

- Blue economy thinking is less about discovering a new frontier and more *about creating a new economic sphere for novel management*

- 'The' blue economy *is an aspiration rather than an object* awaiting discovery
- The acceptance (and potential) of *blue economy thinking rests on novel management of the commons*: negotiating the rights to utilise resources and the ways in which they may be utilised
- Making a blue economy will involve new aspirations, commitments and business models on the part of enterprises, new ways of accessing, harvesting and processing resources (new sectors as well as technologies, environmental efficiency and waste), new forms of distribution of social and environmental costs and benefits, and new principles and practices of regulation and management.

Figure 4 outlines a model for developing blue economy thinking in New Zealand. It accents the importance of actively performing economy differently as opposed to more established sustainable development approaches, which typically accent only production technologies, environmental efficiency and negative externalities. It also focuses attention on ecosystem-based management (EBM) as a core set of principles for steering a new blue economy. Crucially, this approach emphasises an understanding of *environmental management as a fundamental part of economy in resource economies*, and on breaking the unhelpful assumption that regulation and economy necessarily exist in an antagonistic relation to each other.

Figure 4: Applying Blue Economy thinking in Aotearoa New Zealand



5. The marine economy – a starting point

The CVBE project began by thinking about the object of analysis at its heart – the blue economy. How might this be understood and represented as an object of concern and in turn of management? We began with established qualities, framings and representations, the seafood industry and the marine economy.

5.1. Economic uses of Aotearoa New Zealand's marine estate

Aotearoa New Zealand controls the seventh largest maritime area in the world. This area contains substantial mineral and other natural resources. At over 4,083,000 square kilometres the maritime area around Aotearoa New Zealand is more than 15 times larger than the land area (268,000km). Aotearoa New Zealand has the 10th largest coastline of any country, at 15,134 kilometres, and the ninth largest claimed ocean space of any country (Figure 5). Aotearoa New Zealand's maritime area is defined by:

- **Territorial Seas**: regarded as the sovereign territory of the state and is defined as the area of seas that are 12 nautical miles off the coast.
- **Economic Exclusion Zone**: was developed in 1980's as the concept of territorial seas was being challenged. The EEZ is defined as 200 nautical miles off the coast. The exception to this rule occurs when exclusive economic zones would overlap. The state has sovereign rights to use marine resources, both in the water column and the seabed.
- **Continental shelf**: Some nations have made claims to the continental shelfs that extend beyond the EEZ. In 2008 the UN recognised Aotearoa New Zealand's claim to the continental shelf, which extends 1,700,000 square kilometres beyond the EEZ. A coastal nation has control of all resources on or under its continental shelf, living or not, but no control over any living organisms above the shelf that are beyond its exclusive economic zone.

Marine economy has by default been understood as the set of economic activities taking place in, and /or drawing upon resources from, this estate. The definition is complicated by significant boundary issues between land-based and seas-based activities. For ease of reference these issues are generally set aside by using established sectoral categories.

Marine economy has traditionally been seen as some aggregate of resource extraction from marine areas (the capture and processing of fish, the extraction and processing of off-shore minerals, oil and gas); farming in the estate (aquaculture); uses of the resources for tourism activities; movement through the marine estate and support of that movement (shipping and ports); the utilisation of marine resources for new technology industries (blue technology); and management and services activities associated with the marine estate (security and professional activities). As we demonstrate below, boundary issues resurface when efforts are made to differentiate these activities at enterprise scales.

The predominant views among all those interviewed through the course of the project are that:

- the marine economy is economically significant, but makes less of a contribution to national livelihoods than it could or should, given the resources available
- the marine economy has the potential to expand
- expansion needs to be achieved in a thoughtful and sustainable manner, involving novel activities, commitments, and management

Not surprisingly, opinions are more divided on:

- what elements ought to be included in understanding and measuring this economy
- what types of economic activities ought to be promoted to achieve the best outcomes for livelihoods and/or national growth
- how to enhance the use of resources consistent with other values and ethical positions.

Measurement is widely seen as a first step in addressing these questions, and most respondents turn immediately to measures drawn from national income accounting in various forms of aggregation. This is not as simple, definitive, or helpful as we might imagine.

5.2. Creating an object for management

National income accounting was invented by western governments to create economic objects that they could manage as they sought to guide their economies out of depression in the 1930s. These measures were refined in the post-war period to underpin state investment and regulation in what became the high-growth sector-based development models of 1950s-60s.

These *'objects of management'* (e.g. sectors and national economies) and the measures by which they were defined (e.g. standard industrial codes) were designed for a particular type of management (command and control) of a particular type of economy (relatively closed and comprising activity-specific, tightly bounded firms locked into relatively simple supply chains). They were made fit for this purpose.

Today's economies are very different, as are our management goals and tools. Today's economies are more complex, less closed into national or regional settings, and comprised of global capital flows (and sometimes labour movements), and multi-sectoral, less tightly bounded firms embedded in complex global investment and production networks.

In the context of the marine economy, efforts to produce cross-sectoral national income accounting measures *seeks to apply an outmoded architecture of economic management to a contemporary economic, political, and environmental challenge.* Applying our current measurement infrastructure to the marine economy risks mischaracterising the object of management and distorting understandings, which may have negative policy and management effects.

In this section we work through these arguments to suggest that New Zealand needs to rethink the way it comes to know marine economies as a first step in managing them differently. In the most practical of terms, we ask:

- What are we measuring and what are we not measuring?
- What sense can we make of what we are measuring and aggregating into 'the Aotearoa New Zealand marine economy'?

We need to think much more clearly about the purposes for which we want measures; and we need to design a more effective set of tools for economic management fit for a different purpose, in different times.

5.3. Measuring marine economy

Traditional approaches to economic development and economic management tend to involve working with established categories of economic activity. In ocean spaces, formal interest has focused largely on fisheries, which have been measured and subject to policy for decades.

Much of this concern centred on the economic welfare of fishing communities. The rise of global fishing fleets and increasing pressure on fish stocks shifted this focus to industry scale concerns, property rights, and the ecological consequences of policy deficits and management failures. Measurement became more important - of the resource, its ecological vulnerability, and the financial values of stocks and takes.

Sovereignty over the marine estate itself became an issue in concerns beyond the geopolitical games of empires and competing polities at finer-grained scales, especially in relation to international fishing fleets and oil and gas deposits (Gavouneli 2007; Ventura 2020).

In Aotearoa New Zealand crisis points were reached in the 1980s, coinciding with the signing of UNCLOS dominance of neoliberal models of governance and the emergence of major Treaty Settlement claims. The result was the globally prominent experiment with the QMS, and its apparatus of fisheries management models, sustainable yield calculations, tradable quota, fishing areas, annual catch entitlements (ACE), and licensing around distribution and exporting.

A swathe of measures and calculations supported this management regime, which was extended to wild shellfish species. Much of the marine economy, however, was left largely outside of this regime of measures and related management.

The maritime setting of much oil and gas exploration and extraction has also attracted attention in Aotearoa New Zealand, especially since the discovery of the Maui field in 1969.

Statistics NZ measure the 'New Zealand Marine Economy' in 2006 (Statistics New Zealand, 2006). The report grappled with the problems of measurement of activities that were far from

neatly bounded in the standard industrial coding of activities, or were non-monetised (Statistics New Zealand, 2006). The numbers produced shed little new light on the marine economy and did little to help formalise it as an object of management and policy.

The rising interest in the blue economy saw the exercise repeated 2016 (Statistics New Zealand, 2016). That new report coincided with the launch of Sustainable Seas amidst an intensification of interest from Government in the seas as a resource frontier and rising concerns internationally with the environmental limits of growth.

There was now an appetite for an object to manage. The 2016 report measured the marine economy over the period 2007-2013 using the same methodology as that adopted in 2006. The categories measured included:

- Fisheries and aquaculture
- Marine services
- Marine tourism and recreation
- Offshore minerals
- Shipping
- Government and defence

The report found that defined in these terms the marine economy contributed roughly $NZ4 billion to the Aotearoa New Zealand economy in 2013, and an additional $3.7 billion in indirect value. It contributed 1.9% of GDP.

These figures were dominated by offshore minerals, oil and gas, which made up 48% of this contribution, shipping 24%, and fisheries and aquaculture 22% (Statistics New Zealand, 2016). Employment on the other hand was dominated by shipping, fishing and aquaculture. The marine economy contributed 102,400 jobs, 93% of these in those three sectors.

Tourism and recreation were measured at contributing $43 million to GDP (or just over 1% of the total) and 960 jobs (or just under 1%).

The report thus brought into being 'the New Zealand marine economy' in a particular way, cementing understandings that began to circulate in policy, management, media and popular narratives. Oil and gas were presented as the key sector in GDP terms, and fisheries and aquaculture as the sectors of future concern, primary interest and employment generation.

Using data later updated to 2017 StatsNZ (2019) found that i*n the year ended March 2017, the marine economy contributed $3.8 billion to Aotearoa New Zealand's economy (1.4% of total GDP)* (see Figure 5). Indirect contributions to the marine economy (from further economic activity in non-marine industries tied to marine economy activity) was $3.2 billion, bringing the total value of the marine economy to an estimated $7.0 billion or 3% of total national GDP. Headline figures include:

- Contribution to GDP was down from a peak of 2.2% of total national GDP in 2010, reflecting the decline of offshore minerals.
- The pivotal seafood sectors of fisheries and aquaculture contributed a consistent 0.4-0.5% of GDP across the decade.
- Contributions from offshore minerals decreased to 27% in 2017 ($1 billion), down from a high of 57 percent ($2.3 billion) in 2009.
- 33,000 wage and salary earners employed within the marine economy earned a total of $1.7 billion.
- Shipping was the largest contributor to the marine economy at 37% ($1.4 billion or 0.5% of total GDP).
- The direct value added by the BE of 2% per year was slower than the background growth observed in the economy more broadly.

These measures give us a helpful picture of the contribution of key sectors to national income and present time series data to explore some significant structural change within the marine economy. In short, the contribution of the marine economy defined in these terms to the national economy has fallen in recent years relative to other sectors led by a decline in offshore minerals and gas.

Measuring the marine economy across sectors using ANZSIC based measures alone, however, gives an incomplete measure that risks distorting interpretations of economic and environmental benefits.

- data is not available for the full range of tourism and recreational activities (including fishing) - marine equipment retailing is the only ANZSIC class from which to draw data
- sector wages were obtained using the Statistics NZ linked employer-employee data and do not include self-employment
- separating fisheries and aquaculture is complicated by the dominance of major firms who have significant interests in both sectors, making firm-level data problematic
- other marine-based activities were captured under predominantly land-based classifications (eg onshore aquaculture, charter fishing and whale watching)

Three crucial sets of data, then, are missing or partially missing from the ANZSIC-based accounts: tourism, recreational fishing, and other recreational, cultural or amenity ‘uses’ of marine resources.

The figures did not capture other contributions. Other studies, for example, suggested that over 1 million people p.a. take to water in 900,000 craft, spending $1 billion, and catching $180m fish (see Yeoman et al. 2019). Further, these figures do not include cruise ship visits (estimated at attracting over $570 million of spending in 2019-20, up 28% from $434 million in the 2018-19 season), or education and training, estimated at $10.2 million derived from 1170 students in maritime engineering and technology and fisheries studies.

Aggregating wild fisheries and aquaculture presents its own problems. It underplays the growing importance of the latter relative to the former, while including activities that make limited sense in the wider category of marine economy as an object of resource management.

That shipping is then the most important element of the marine economy may suggest that we under-utilise marine resources but confuses the story of how we do utilise those resources.

These two problems are related in that it is probably the combination of tourism, aquaculture fisheries, and currently non-monetised activities that represent the most useful object of management, if questions of management are to do with utilising resources and enhancing economic, socio-cultural, and environmental well-being in the context of competition over access to resources, cumulative and cross-sectoral effects, and contests over values in multi-use ocean spaces at different scales.

To address these problems, the CVBE project commissioned research from Market Economics (ME).

5.4. Remeasuring marine economy

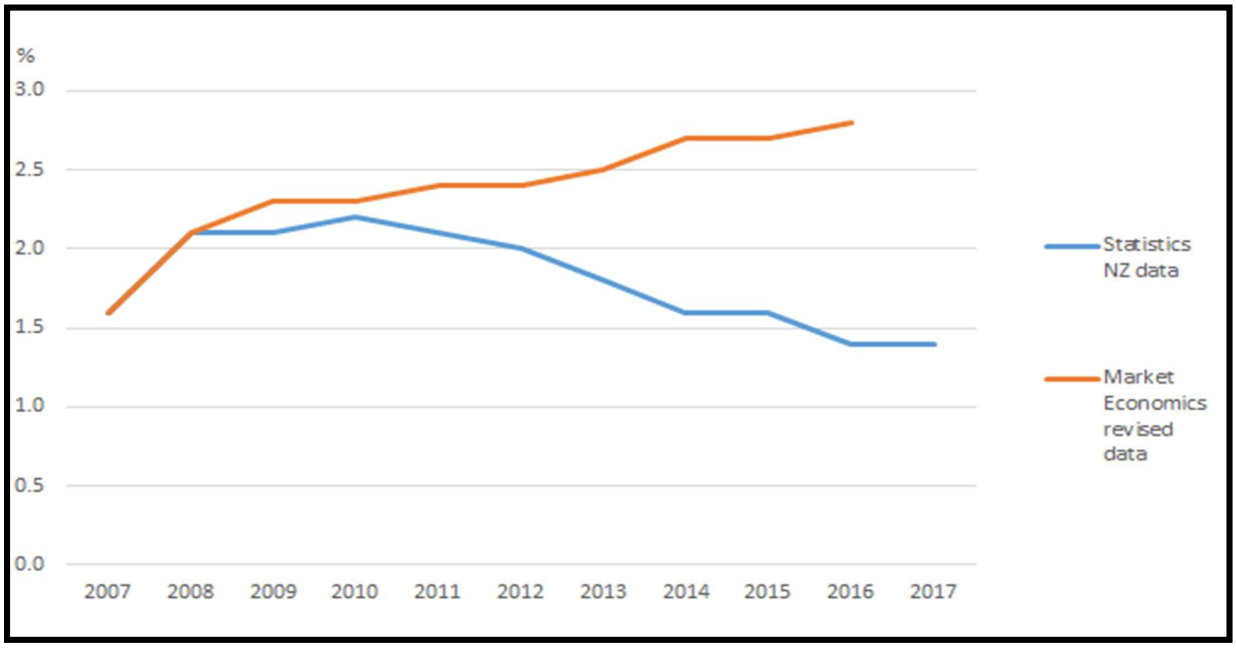
The CVBE project commissioned Market Economics (ME) to remeasure Aotearoa New Zealand's marine economy using a Total Economic Valuation (TEV) framework. Used by Treasury, TEV, considers both use and non-use values (van Zyl & Au, 2018), and aims to overcome some of the shortcomings of using GDP or wages data.

The primary difference between ME's measures and those produced by Stats NZ is that ME included wider estimates of coastal tourism. Market Economics (Yeoman et al. 2019) found that:

- coastal tourism increased consistently by 6% per annum over the period of 2007-2017, contributing $3 billion to national income in 2017 (1.1% of the national economy)
- coastal tourism contributes 40% of the value of marine economic activities, and 62% of marine economy jobs
- the contribution of marine economy to GDP may be as high as 3%, double the contribution identified by Stats NZ
- When broad estimates of the indirect and induced economic impacts from marine economy activities are included, the contribution of marine economy activities may reach as high as 5% of the national economy

The impact of the different measurements on gauging the contribution of the BE can be seen in Figure 5, which significantly revises upwards the contribution of coastal tourism.

Figure 5: Graph of the total marine economy as a % of GDP



While Market Economics did not utilise the TEV approach to produce estimates of the value of recreational uses of marine resources, cultural and amenity values, and measures of ecosystem services, the report demonstrates the limits of ANZSIC based measures of the marine economy. The report prepares the ground for a new suite of measurements should fit for purpose measures of ecosystem services and cultural values become available.

The primary finding of this report about *the significance coastal tourism fundamentally shifts the ground in understandings of marine economy and how its should be managed*. Tourism's economy is more locally-oriented. It has a different organisation and community and environmental imprints to the seafood-based industries that dominate conventional understandings of marine economy. The finding suggests the need for new policy priorities, research initiatives, and management approaches.

5.5. Measurement for managing Aotearoa New Zealand's Marine Economy

In both these reports, the 'marine economy' is defined and measured in terms of activities coded into ANZSIC-based data *rather than by building up an account from the activities (market and non-market) and non-uses that actually take place*. It is important to consider what this means for economic management, especially in terms of transitioning to a blue economy and creating value in it.

While the effort to create 'the marine economy' as an object for management reflects a welcome determination to decentre fisheries in political understandings of marine economy, it has some significant boundary issues: dominance of major firms whose activities cross sectoral

boundaries; delinking marine professional services, marine manufacturing and supplies, and oil and gas activities from land-based activities; identifying the marine dimensions of tourism; and debating the classification of transportation in the mix. Some sectors (oil and gas) and much more in terms of total value added, while seafood processing adds more jobs, and tourism adds more jobs to smaller businesses and smaller communities. When sector measures are combined, differential contributions are lost.

Much is also missing (e.g. marine education), underestimated (tourism), or invisible (non-monetised activities).

Tourism plays a key role in marine economy, especially at the community level. This is likely to grow in any future BE, particularly eco-tourism. Our ability to determine its economic, environmental and social impacts will be crucial. While ME makes estimates of tourism value, *more fit-for-purpose measures must be found at multiple scales and across multiple forms of activity* if we are to use such measures as a management tool in the marine estate.

Other uses and values are less widely measured or measurable. Research by New Zealand Sport Fishing (representing recreational fishers) found recreational fishing in Aotearoa New Zealand generates $1.7 billion in economic activity and that recreational fishers spent approximately $950 million and supported 8,100 full-time jobs - more than the 3 largest fishing companies combined (NZMRF 2016).

While the research underpinning the numbers is commissioned to demonstrate the significance of recreational fishing, the numbers are large. They demonstrate the significance of the activity in pure commercial terms, even before the value of the catch or recreational values of the activity are estimated.

The exercise highlights the technical and political challenges in measuring and interpreting the value of economic activity: does recreational fishing, for example, include equipment, big equipment such as boats (about one third of the total spend), bait, fuel, travel, accommodation, ice creams, and so on.

Market Economics conclude that while there is “reasonable information” on recreational fishing from which to generate measures, we currently have no agreed measures of recreational fishing, customary fishing, or other cultural, spiritual, amenity, and non-use values associated with human engagement with coasts and oceans.

The marine economy as defined by Statistics New Zealand and associated political and popular discourses is a largely unhelpful object for policy making or management. The figures help to confirm what we already know: we generate less national income than we might relative to the size of our marine estate; wild fisheries and mineral extraction are both falling away as the most significant commercial uses of that estate; and we have poor measures of tourism and the value of recreational uses of marine areas. Aggregating across the few sectors involved adds

virtually no new insight to sector data alone. As a category the marine economy adds little to our knowledge for managing for greater ecological sustainability or directing marine resources to benefit local communities.

On the one hand, much of the marine economy is unmeasured, while existing measures do not capture all economic benefits generated by the maritime estate, especially if we understand economy broadly.

On the other hand, it is unclear what is to be gained by aggregating transportation, port use, defence, tourism, aquaculture and tourism into a single measure for management purposes. For example, why mix marine resource-based economy with national trading and development infrastructure such as ports and shipping?

Ports and shipping are connected to the oceans, have environmental externality effects, and are connected to multi-use contests from time to time (shipping lanes are an issue for fisheries and aquaculture, for example), but it is unclear that these connections define a meaningful, distinctive and enduring aggregate category in management or policy terms. Certain ports (Nelson, Lyttleton and Bluff for example) have a particular significance for fishing fleets, Kaikoura is crucial for Whale Watch, Port Taranaki is pivotal to oil and gas, and many smaller regional ports are acquiring increasing significance for aquaculture operations. Yet the larger ports of Auckland, Tauranga, Northport, and Wellington are clearly more connected to aquaculture, forestry, retailing and used cars.

5.6. Measurement for managing Aotearoa New Zealand's Marine Economy

Boundary issues such as those we have discussed commonly undermine efforts to develop aggregate measures of economy, be it at a sectoral or cross-sectoral scale. In the case of the Aotearoa New Zealand marine economy, these boundary issues overwhelm efforts to produce the marine economy as an object of management for policy makers or popular discourse. Rather they leave commentators to highlight certain headline figures at a sectoral level as matters of concern e.g. fish exports, oil and gas revenues, or aquaculture growth.

Measures at a sectoral level can provide useful evidence and insights for policy making and resource allocation. The BERL report on the economic contribution of commercial fishing to the New Zealand economy (Williams et al. 2017), for example, is a rich trove of data that breaks down employment numbers, outputs and value added measures by inshore v. deep water, Fisheries Management Area (FMA), individual fish stock, fishing/processing and other material levels that are helpful for policy makers, investors and managers. In the next section, we use qualitative and other documentary data to explore the implications of sectoral measures in standard, sector-based economic development terms.

More fundamentally, the measures presented above do not produce an object of management or support a knowledge framework for transitioning to a blue economy. More subtle measures and understandings are required even to capture the marine economy in the reductionist terms of economy represented in national income accounting, let alone in the deeper sense of economy that must underpin effective transitioning.

Different measures and management tools are required to value and stimulate blue economy transitions, including accounting for non-market economic uses at multiple scales, ecosystem damage or services. Much hope has been placed in ecosystem service measures and associated valuation frameworks.

The challenge is deeper than simply identifying approaches and generating measures that will monetise uses and values. It is important to consider, for example, mātauranga Māori concepts and indicators as well as new approaches to evaluating priorities in resource use conflicts. Does a dollar's worth of recreational fishing return really equal a dollar's worth of export earnings, a dollar's worth of local spending or salary, or 'a dollar's worth of mauri'? Can we really derive conversion factors? Are these things ultimately commensurable even if meaningful valuations can be derived? In what circumstances it is possible, ethical, or wise to assume that they are commensurable?

The *prior question must be 'what do we want to manage, and how and why?'*. Efforts to measure the marine economy are a long way from this point. New measures will need to be fit for purpose, and we will need to develop new ways of using them (or not using them). We need to begin by understanding the economy differently. We take up these questions later in the report.

6. Lessons from measuring marine economy in sectoral terms

The construction of the marine economy as a management category has proven useful in starting a conversation about the role and significance of the marine economy. Like measures of natural capital and ecosystem services, it has attracted attention to important debates about resource use conflicts and how best to manage them. While they involve significant boundary issues, they have:

- provided a partial measure of total income from marine space (as a national asset)
- provoked discussion of a blue economy and helped to put it on the policy agenda at national and local levels - the idea of a marine economy is entrenched within industry and development agencies
- suggested that Aotearoa New Zealand under-utilises its marine resources, and provided an initial framework for how to move forward
- demonstrated that discussions of potential economic growth (national and regional) using existing measures remain more effective at an individual sectoral level
- delivered time-series data that highlight key sector-level development trajectories in relative terms, demonstrating that structural changes are underway
- highlighted the dominance in national policy imaginaries of high-order measures derived from a limited range of sectors (fisheries, aquaculture and oil and gas)

Their failings have in themselves been helpful - highlighting the need to create objects of management for decision making in multi-use environments by better accounting for:

- the contribution of tourism, professional services, and technology sectors as well as non-marketised uses of marine spaces (environmental, livelihood, and community goals)
- uses and connections at multiple scales regional and local (the value of ecosystem-level economic measures)

Put alongside our interview, workshop, and other secondary qualitative data, existing measures do allow us to say more about marine economy at a sectoral level.

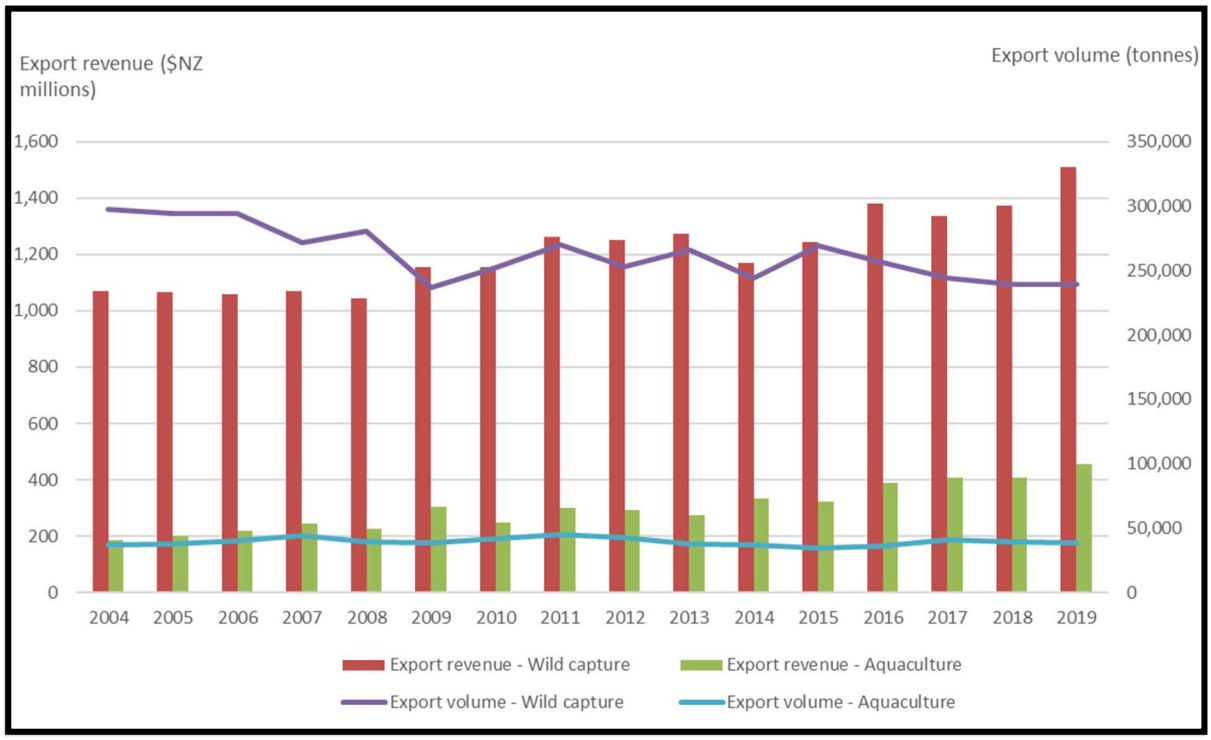
6.1. Wild fisheries

Wild fish catch can be tracked through the quota management system (QMS) data, while seafood exports can be tracked through export data (Williams et al. 2017). Fisheries have seen export volumes fall but reassuring recent increases in output and export values.

Catch has followed international trends, levelling off over the last 40 years (Figure 6). Increases in future output and export volumes are restricted by biological limits to fish growth in existing and changing habitats, limits imposed by the Quota Management System (QMS), and public

disquiet over the history of environmental damage and on-going concerns (by-catch, benthic disturbance, impact on iconic species and sea birds, labour relations). The possibility of adding new species to the QMS notwithstanding, a report written for the New Zealand government notes that there is little likelihood of significant volume or throughput increase in the future (Coriolis Ltd, 2017, p. 5).

Figure 6: Export revenue and export volume for wild fish and aquaculture, 2004-2019



Source: MPI situation and outlook data

Future growth is likely to be restricted to price-led income growth (from value-add to products and price gains from global scarcity). Attention to adding value may provide for modest future growth, while fish prices are likely to continue to trend upwards due to changes in diet, rising incomes, and globally constrained supply. There are important differences in cost-structures and future possibilities between inshore and offshore fisheries, but volume-led growth appears unlikely.

New species development is held out as an opportunity, particularly in offshore fisheries, but this will involve regulatory change, new technology and market making work, and supporting ecological analysis. Again, there will be biological and ecological limits.

Fishing has been a site of technological innovation. At an enterprise level, productivity gains through new technology may also support on-going commercial success. Technologies that

reduce environmental impacts promise to lead to blue economy gains at collective scales through reduced environmental harms and value gains from environmental certification, provenance values, and branding. Productivity gains leading to cost reduction in isolation from similar advances elsewhere in the economy, however, are likely to put pressure on jobs.

Representatives from government agencies, Māori fisheries entities and large and small fishing companies agree that a successful fisheries future must lie in value-add.

6.2. Aquaculture

Figure 6 confirms a second key pattern at the core of Aotearoa New Zealand's recent marine economy development trajectories – aquaculture has experienced an average growth rate of 10% since the mid-1970s. Aquaculture is export-oriented, with exports are dominated by mussels (62%) and salmon (32%). Oysters are the third major product. Salmon exports have grown markedly in recent years (Yeoman, Fairgray, & Lin, 2019, p. 16). Both the King Salmon cultivated in Aotearoa New Zealand and the indigenous green-lipped mussels are seen as high value foods on overseas markets. Demand is growing internationally for them and for processes mussel products (Coriolis p. 19). While export volumes have levelled off over the last decade, values are increasing.

Aquaculture New Zealand has been able to point to these growth trajectories relative to wild fisheries to support its lobbying for science investment and development support (New Zealand Government, 2019). Aquaculture is widely seen as poised for, and committed to, transformational growth in Aotearoa New Zealand.

The *New Zealand Aquaculture Strategy* aims to move from aquaculture earning over $600 million and supporting 3,000 regional jobs presently to earning $3 billion and supporting in the order of 6,000 regional jobs by 2035 (New Zealand Government, 2019). Regions such as the Coromandel are becoming distinctive aquaculture regions, where employment is reaching 5% of year-round, full-time employment (https://www.tcdc.govt.nz/Economic-Development/Aquaculture/Economic-impact-of-aquaculture).

Most commentators, either in interviews or workshops conducted in this research, support the view that there is enormous potential for growth. Industry perspectives on how to realise this potential revolve around issues of access to space. Other barriers and challenges include technologies necessary to enable open ocean farming and thus create more ocean space, product development, and scientific knowledge with respect to farming new species and sectors.

Global demand is strong and only a small fraction of Aotearoa New Zealand's coastline is farmed. Opportunities exist in new product areas (seaweed, land-based fin-fish and hatcheries), processing farmed foods into high value nutritional products, and circular economy

uses of the whole product (shells, unprocessed meats, unwanted seaweed). Aotearoa New Zealand firms are interested in a range of new products and/or sub-sectors (Envirostrat 2019; Yeoman, Fairgray, & Lin, 2019). There is significant interest in seaweed as an economic opportunity – for seafood, green fertiliser, platform for blue biotech and basis for carbon sequestration (Envirostrat, 2019).

The development of open-ocean farming capabilities is seen as pivotal to these growth strategies and the answer to competing 'values' and social, environmental, and regulatory constraints on access to coastal space for farming. Open-ocean farming is widely seen as the key to unlocking massive increases in scale and the path to volume-led growth. However, it is currently limited by regulation, technology, and risk-based biological and ecological assessments of costs and benefits of different options.

These challenges were widely voiced in interviews and workshops and are articulated in the New Zealand Aquaculture Strategy, which sets out how the sector intends to respond in relation to other government policy such as climate change goals (New Zealand Government, 2019, p. 4).

Much scientific, technical, market and socio-political research has yet to be done to ensure that these strategies (value-added or volume) align with environmental, social, and cultural concerns and market possibilities. The scientific and technical work is on-going.[7] Work within Sustainable Seas points to the significance of the political and environmental challenges, and the limitations of social licence and universal values frameworks as tools for aligning interests.

We offer an alternative approach to social licence and values frameworks below (Section 11.2.2), but observe that *this might start by ensuring that volume-based models of development are balanced at the outset by an attention to value add through provenance values, product development, processing, and packaging.*

Currently, for example, mussels are a largely unprocessed export commodity. The Aotearoa New Zealand commodity trap looms (Coriolis p. 8): initial gains, falling returns, industry consolidation, lower employment, loss of rents to international owners, and low local multipliers. Exporters are experimenting with higher value derivatives such as mussel oils, but again the implications of any drive to volume production needs to be thought through in terms of key blue economy management questions such as allocating farming space and ensuring returns stay in the regions. In the context of growing international competition, farming for high volume exports may prove a low value use of space (in terms of social, cultural and environmental values as well as financial).

[7] For example https://www.sftichallenge.govt.nz/our-research/projects/spearhead/precision-farming-technologies-for-aquaculture/; https://www.aut.ac.nz/study/study-options/science/research/aquaculture-biotechnology-group.

6.3. Offshore minerals, oil, and gas

Mineral extraction has been a dominant sector in Aotearoa New Zealand's marine economy but has diminished in importance and faces significant environmental and political hurdles.

The value of mineral extraction has declined since 2011 as oil field production and expenditure on oil and gas exploration has declined (Yeoman, Fairgray, & Lin, 2019, pp. 19-20). Multiple measures of mineral extraction and their impact on regional and national economies, can be traced from the Ministry of Business, Employment and Innovation's oil and gas production data.[8]

The sector faces an uncertain future as existing oil and gas fields are run down and new exploration is challenged by environmental concerns. In 2018, Aotearoa New Zealand passed the Crown Minerals Amendment Bill which curtailed new offshore oil and gas exploration in the immediate future. This has significant regional implications for Taranaki in particular (Yeoman, Fairgray, & Lin, 2019, p. 20).

Off-shore sand mining is restricted largely to harbour dredging, while two high profile offshore mining proposals (iron sands in South Taranaki and phosphate on the Chathams Rise) have recently failed to make it past environmental regulation to commercial reality.

It has been estimated that Aotearoa New Zealand has potentially $500 billion of mineral resources in its maritime area (CAE 2003). While such measures are broad estimates, this is a significant asset and promises significant income-generating potential from royalties and taxation. Future governments may well relax environmental and other constraints on development activity.

In workshops and interviews conducted as part of CVBE and aligned research, opinions were divided as to whether this sector has a role in a blue economy or is comparable with other sectors in an aggregate marine economy.

Some argue that extraction of minerals, from oil and gas to sand and phosphate has significant negative environmental impacts on ocean environments and global environmental change and thus can have no place in a blue economy or sustainable environmental futures. Others see the sectors as a source of national income to be exploited within limits. Some make more subtle arguments about the scale of impacts, the location of sites of extraction, the problems with alternatives, and the possibilities of more sustainable extraction.

Clearly the ocean-based oil and gas exploration and extraction economy has significant value creation opportunities for Taranaki communities, as well as a set of ecological risks. There are

[8] See https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/oil-statistics/

other potential sites of extraction. Iron sands may have lesser revenue streams and lower multiplier effects, while the questions of how, where, and how much associated with offshore natural phosphate extraction are have their own complexities (including environmental trade-offs with the costs of synthetic alternatives at local and planetary scales).

The latter set of arguments is generally premised on the values of economic growth in terms of national income and local employment, global requirements for the resource in question, and the principle that environmental harm can be minimised. Advocates continue to argue that such benefits outweigh potential harms, and that new technologies and private and public regulatory standards are improving production standards and reducing potential harms.

Whatever the future of minerals extraction, minerals offer some promise of processing or supply-related jobs, but minerals are commodities and mineral extraction tends to be a rent economy. While royalties are paid, rents tend to accrue to prospecting rights holders and extractors rather local communities, even though royalties are collected at a national scale.

The question of whether there is a place for mineral extraction in a New Zealand blue economy is a political one. However, if minerals extraction is to fit definitions of blue economy, any future commitment should attend more closely to the question of retaining rents locally (Section 10.3.5). Should any legislative and policy change initiate a new round of negotiations over consent, then the terms of ownership of rents and distribution of benefits should be on the table alongside environmental constraints on practices.

6.4. Tourism

Coastal tourism[9] is underpinned by Aotearoa New Zealand's commodity tourism industry, independent international travellers responding to Aotearoa New Zealand's tourism reputation, and largely independent domestic tourists.

It is difficult to measure, but by 2019 coastal tourism had become the largest contributor to Aotearoa New Zealand's marine economy, generating circa $3 billion in income, or a little over 1% of total GDP (Yeoman et al. 2019).

Coastal tourism is a major element of the national tourism product (Environment & Stats NZ, 2019; Department of Conservation, 2020), which Pre-Covid was Aotearoa New Zealand's largest export earner and contributed nearly 15% of national employment in 2019 (https://www.stats.govt.nz/information-releases/tourism-satellite-account-2019; https://www.stats.govt.nz/information-releases/tourism-satellite-account-2018). One in three international visitors to NZ undertake a scenic boat trip and half visit a beach.

[9] We will use the term 'coastal tourism' here, as used by the ME report.

The cruise liner industry, owned and controlled from international hubs, sells experiences in Aotearoa New Zealand oceans and coastal settings. These experiences are then converted into spending in Aotearoa New Zealand based shops and experiences (some focused on coastal tourism). While the extent to which this spending and any servicing or reprovisioning of ships is fully part of coastal tourism involves complicated definitional questions, the activity generates national income that may not materialise without the coastal experiences (on ocean or shore). Expenditure in Aotearoa New Zealand by passengers on cruise liners alone totalled $570 million in 2019 (up 28% from 2018) – and more than export revenues from aquaculture.

Coastal tourism also caters for the more than 75% of Aotearoa New Zealanders who live within 10km of the coast and domestic travellers whose spending supports local areas elsewhere. Marine spaces and activities within them are crucial to social and cultural reproduction, generating massive non-monetary value as well as tourism-related livelihoods. Domestic tourism relies heavily on coastal resources, even if this reliance is notoriously difficult to delimit from other forms of cultural and economic activity and measure. Gathering kai moana, recreational fishing and specialist seafood restaurants/retailers are also key dimensions of Aotearoa cultural life, blurring measurement categories.

Tourism is Aotearoa New Zealand's largest industry and has been growing rapidly. While high volume tourism dominates measures of total value, the sector supports large numbers of small, geographically dispersed businesses involved in marine-based sightseeing, recreation and related services. Low barriers to entry and the geographically dispersed nature of activities mean that there are opportunities for many entrepreneurs and communities.

Entrenched growth-centred views of economic success tend to miss the diversity of coastal tourism, its actual and potential links to higher value activities such as charter fishing, food-linked tourism, and high-profile iconic mammal watching. Indeed, CVBE research has identified businesses that are finding novel ways to add value through specialisation, educational and adventure elements – as in the case of champions such as Whale Watch, Dive Tutukaka, and Mills Bay Mussels

While there is considerable uncertainty about the future of tourism as the world struggles to emerge from the Covid-19 pandemic, coastal ecotourism is seen as having significant growth potential. The pandemic has cast a spotlight on the low-value, high-volume nature of much of Aotearoa's tourism, as well as its vulnerabilities to international shocks. As industry actors and government agencies think forward to post-Covid development trajectories, they are already placing a premium on sustainability and higher value products.

Much of the added value in ecotourism is increasingly associated with regenerative dimensions and activities with strong links to the commons. In the oceans these commons are conceived and regulated in different ways into a 'conservation estate' – mātaitai, taiāpure, marine reserves and other yet to be developed formulations of restricted rights to the commons. These

possibilities connect to the aspirations of the Department of Conservation (DoC) and related guardians of marine commons to initiate regenerative tourism in and around the conservation estate, which currently makes up only 0.4% of the territorial waters.

The challenge, especially in the wake of the Covid-19 pandemic, is to find ways to add value by, for example, extending these regenerative dimensions and integrating tourism experiences with other dimensions of marine economy such as aquaculture and fishing. *The commons are a crucial soft infrastructural and social capital asset for coastal tourism*. Coastal ecotourism offers an opportunity for a post-Covid recovery that diversifies away from bulk processing of tourists.

Blue ecotourism promises to underpin a vibrant blue economy that supports livelihoods, produces jobs, stimulates local and regional development, enhances a Māori blue economy, and protects and restores marine environments. Planning recovery from Covid-19 offers an opportunity to break volume models of blue tourism and reset them in ecotourism modes. The champions are in place to achieve such a transformation, and new commitments are being made to novel products such as interactive aquaria and engagement with marine environments (New Zealand Government, 2019).

6.5. Blue technology

There is a significant and broad ranging interest internationally in blue technology - as a stand-alone economic sector as well as an enabling solution to aquaculture and other challenges (New Zealand Government, 2019, p. 4). A blue-tech economy offers:

- enabling technologies for existing activities (applications for fishing and aquaculture to support productivity gains, upgraded fishing fleets and aquaculture infrastructure, new products, or environmental improvements e.g. precision seafood harvesting, mussel spat farming)
- new products or processes derived from sophisticated processing technologies: e.g. mussel oils, powder and extracts, fish skins for medical applications
- bioactives that yield patents and potential commercialisation opportunities for as yet unimagined, unknown or un-marketed products via a derivative biotech industry
- new technologies that promise sea-changes in existing industries within and beyond the marine economy (engineering, imaging technologies, and artificial intelligence for off-shore aquaculture; ocean-based energy production utilising kinetic energy or wind)[10]

While the value of the sector is not measured and much of its potential remains largely promissory, research in CVBE pointed to widespread interest.

[10] Energy Efficiency and Conversation Authority (2012) Marine Energy Deployment Fund 2007 to 2011.

Global health food markets are argued to be expanding, and Aotearoa New Zealand is seen to be a quality producer (Sankaran and Mouly 2007). While smaller companies are taking some time to secure niche markets and penetrate mainstream markets internationally, multiple firms are producing health and nutritional products from marine organisms.

Key informants highlighted the higher returns possible from mussel powders over selling mussels as unprocessed foods. They also pointed to the ease of taking a fully processed and non-perishable product to high-volume global markets ie relative to a perishable food product

Mussel oil is making up an increasing proportion of a mussel exporting industry that is worth around $300m to Aotearoa New Zealand. The rising price of live green-lipped mussels is argued to reflect this competition for mussels as an ingredient

Nelson's Pharmalink, for example, has developed a technology to extract marine oils from mussels, initiating a high value industry. The Nelson-based network of producers, processors, and marketers centred on MacLab, Pharmalink International, and their technology to extract powders and oils from mussels, presents an increasingly stable platform for growth.

Sanford's 'Sea to Me' brand of mussel oils in Nelson is tied into this cluster. Sanford announced in November 2019 that it intends to create a $20m Marine Extracts Centre in Blenheim. The centre is focused on the discovery and production of high value nutrition products from New Zealand seafood and highlights the extent of current interests in mussel extracts, pet food and nutraceuticals.

Other initiatives have sprung up in high-value nutrition as well as medical applications through ventures such as Auckland's Revolution Fibres. Others, such as Aroma in Christchurch, are relatively long-standing and provide value-added human and dog-food nutritional products.

Multiple bioactive prospecting and patenting initiatives have also been launched through CRIs and universities, and more than fifteen biotech and related initiatives applied for funding under the Sustainable Seas Innovation Fund.

Māori economy actors are active in the blue-tech sector, with entities such as Hikurangi Enterprises, Ngai Tahu, and Wakatū working in partnership with science providers and various forms of venture capital. Their interests are framed in terms of value-add, but also kaitiakitanga and local livelihoods.

Applications under the Sustainable Seas Innovation Fund in 2020 included multiple blue-technology expressions of interest. The Fund is supporting four blue tech initiatives. Two will examine bioactive potential associated with starfish and algae respectively, while the other two will explore the potential of mātauranga Māori derived technological applications in aquaculture.

Research in CVBE suggests that despite formal recognition in the New Zealand Aquaculture Strategy, Aotearoa New Zealand has approached this sector less strategically or coherently than seafood. Market Economics (Yeoman, Fairgray, & Lin, 2019, p. 29) observes that there is no national strategy for marine biotechnology or biosciences and that the sector is neither measured nor monitored. Envirostrat echoes these observations and argues that a more coordinated development is required (Envirostrat Ltd, 2019, p. 8).

There is no systematically constructed baseline from which to assess the sector or guide future investment priorities, and few institutions through which to coordinate and manage development. While some of this reflects the commercial sensitivities of discovery-based activities, the heavy public investment involved and the role of the sector in enabling value-add across the marine economy both suggest a need for closer monitoring and coordination.

This argument was widely echoed by 'Blue economy' workshop participants, who called for a shift beyond a fragmented and promissory foundation centred on competing research trajectories at Crown Research Institutes and universities. They welcomed the intense levels of activity but questioned the uncertain and shifting priorities of multiple providers, projects, sectors, and funding agencies (Envirostrat 2019). Efforts to coordinate this investment are overdue. They should address:

- the values, costs, and benefits of conducting enabling technological research in Aotearoa New Zealand as opposed to purchasing that technology
- the different value propositions of new technologies that deliver value-added gains rather than new rounds of commodity production and processing
- who benefits, to what extent where ie will the investment stimulate regional economies

Blue economy thinking imposes a set of evaluative criteria on these questions:

- Investment in new production technologies and products should be demonstrated to enhance environmental values - do no environmental harm, replace damaging production approaches, create opportunities for extending blue economy, stimulate shifts away from commodity mentalities, and add credence values across all sectors through provenance, environmental commitments, and social justice
- priority should be given to activities that support EBM and contribute to livelihoods and jobs for local people in local environments
- investment should be coordinated and fully assess the value and incidence of costs and benefits across the range of enabling and discovery claims made by actors involved

6.6. Professional support services

There are currently no measures of professional support services in marine economy, although there are multiple enterprises operating in this space. These include research organisations,

specialised environmental and economic consultancies and legal services that sell advice to marine economy actors (central and local government, enterprises, iwi entities and industry organisations), as well as service providers who supply marine economy actors as part of their wider businesses (labour recruiters, education providers such as NMIT and so on). There are also a range of professional intermediaries at work in quota trading, market distribution, and branding, certification and industry promotion.

At a time of rapid technological change, pressures for improved environmental performance, and government support for growth agendas in industries working in marine environments with biological entities, the marine economy is entangled in multiple and diverse research and development initiatives. Many of these initiatives are government funded and involve major research providers (the universities, NIWA, Plant and Food Research, GNS, Cawthron, National Science Challenges) as well as a number of private providers.

6.7. A sector-based reading

Drawing on qualitative research and the national income accounting measures produced by Market Economics (2019) and Statistics New Zealand (2019), we can point to five significant trends at the sectoral level:

- The contribution of offshore oil and gas, which provides national level revenues and localised on-land multipliers, has declined significantly over the 2010s
- The contribution of wild fisheries and aquaculture has plateaued, but aquaculture is poised for significant expansion (wild fisheries will rely on price gains from market pressures and niche products from value added marketing for future growth)
- We know little about marine economy professional services, but they are potentially significant employers
- Blue technology activities (as products in themselves and value-add solutions to aquaculture) are widely seen as sites of potential growth but currently rely on state investment
- Marine tourism is highly significant and by 2019 had become comfortably the biggest employer and revenue earner in the marine economy (especially in regional areas), but it is underestimated in conventional measures and its future is under severe pressure from the Covid-19 pandemic.

7. Behind the sectoral measures

There are important policy implications to be drawn from the conclusions to the previous section, albeit little that is not already known and little that helps drive a decisive transition to a blue economy.

New categories of measurement and management concern are required to make blue economy policy and stimulate transitions, evaluate proposed changes, measure impacts of change, and stimulate, policy, and manage an emerging blue economy at flexible and non-standard scales

In this section, we begin to move away from standard analysis to reconceptualise marine economy as blue economy and ask what might be done to stimulate a transition in practice in Aotearoa New Zealand. We begin by digging down behind the sector level measures to unpack the activities that make up the stuff of an emergent blue economy.

7.1. An extraordinary diversity of enterprises

One of the key findings from the qualitative research at the heart of the CVBE project is the diversity of enterprises involved in the marine economy described in the previous section. This diversity is hidden by aggregate sector level data. We studied multiple forms of enterprise (Table 2).

Axes of difference include sector (from education, research, and professional services to seafood and tourism), size and complexity (large integrated seafood firms to local recreational users), capital foundations (from small family-run operations to large domestic research organisations, and international investments in fishing and cruise operations), market orientation, and ethical commitments to blue economy.

The marine economy comprises commercial enterprises ranging from large public companies such as Sanford with approximately 1,600 employees operating across blue tech, aquaculture, fisheries and research to one-person sightseeing operations renting kayaks to tourists in Kaikoura, and individual or family-based recreational or customary shellfish gatherers and fishers. It includes fishers, family marine farmers, and processors, value chain suppliers from universities to fishing gear firms, and specialised downstream actors from restaurants to retailers and global intermediaries.

Prominent among these entities are Māori aquaculture and fisheries interests ranging from whānau businesses to iwi commercial entities, their supporting trusts, and joint-venture partners, and pan-iwi organisations.

Table 2: Sample of diversity of economic actors at work in Aotearoa New Zealand Blue Economy

Enterprise	**Sector**	**Employees**	**Capital**
Multinational seafood Co.	Fully integrated fishing (quota, in-shore, open ocean), seafood, aquaculture, blue tech operation	> 1,000	Global corporation
Seafood enterprise	Fishing (on-shore, off-shore), aquaculture, quota owner		Iwi capital
Multi-sectoral enterprise	Fully integrated seafood enterprise, links to land-based industries	10-100	whānau capital
Blue-tech enterprise	Marine bioactives - start-up structure	1-10	Iwi, public, cooperative
Community enterprise	Seafood gathering collective	Casual	No formal
Ocean products enterprise	Gathers ocean products and processes into multiple products	< 10	whānau based
Community	Distributes fish products	Voluntary	Philanthropic
Shellfish harvester/exporter	Quota holder, shell-fisher and processor	<10	Private
University institute	Marine science research organisation	10 – 100	Public/philanthropic
Integrated tourism aquaculture	Incorporates accommodation, restaurant, and aquaculture	< 10	Family
Professional services	Specialised ocean-based legal advice	<10	Private partnership
Coastal infrastructure	New Zealand port	100-250	Public
Fishing company	Fully integrated fishing operation	10-100	whānau
Seafood services	Fish receiver/exporter, quota broker, promotions	< 10	Family
Professional services	Research and advisory services to seafood firms	< 10	Private
Seafood processor	Aquaculture products, circular economy enterprise	< 10	Private
Research organisation	Marine research organisation	250-1000	Charitable Trust
Pan-iwi Industry organisation	Responsibilities for iwi enterprises	10-100	

Industry organisation	Responsibilities for industry development	< 10	
Marine tourism	Small-medium sized enterprise	10-100	Private
Marine tourism	Mammal tourism	10-100	whānau
Seafood restaurant	Coastal, seeking to expand to experience tourism	< 10	
Professional services	Research and advisory services	< 10	Private
Professional services	Research and advisory services	< 10	Private
Mussel farmer	Mussel farmer with tourism interests	< 10	Private
Fishing company	Quota owner, fish purchaser, processor, brand owner	10-100	Private
Fishing services	Fish exporter, quota broker	< 10	Private
Mussel farmer	Iwi enterprise	10-100	Iwi development trust

In the seafood sector (fishing and aquaculture), the big three firms (Sanford, Talleys and Sealord), together with Moana New Zealand (at roughly 5% of the sector) contribute roughly half of total production and revenue. These firms are fully integrated, owning quota, operating fishing vessels and aquaculture farms, processing catch/harvest, owning brands and export licences and distributing to market. Sanford is also the leading player in blue technology seafood products.

Another 25% is contributed by ten medium sized enterprises, and the remainder by approaching two and a half thousand smaller enterprises (Coriolis, 2017). Roughly 35% of total income generated (including Sealord, Moana New Zealand, and iwi sale of annual catch entitlements) is controlled by Māori enterprises at iwi, hapū or whānau scale (Reid et al. 2019).

Aquaculture enterprises vary from small farmers to major iwi enterprises such as Whakatōhea Mussels and Pare Hauraki Kaimoana as well as the major seafood companies.

Other enterprises exist in niche parts of the industry – owning quota and selling ACE, owning and operating fishing vessels, exporting fish, brokering quota and ACE, processing seafood products, owning brands, operating mussel or oyster farms, prospecting for bioactives and owning patents, gathering beach-cast seaweed, processing seaweed purchased as waste from commercial mussel lines and so on.

Tourism firms range from small family enterprises selling tours or renting kayaks to medium sized providers of mammal watching packages or diving experiences, fishing charter firms, national fishing and hunting retail chains, the Department of Conservation as a provider of access to experiences, steward of marine environments, and regulator of MPAs, and multinational transport and accommodation providers.

The oil and gas sector is dominated by large global exploration and production companies, notably the domestically owned Todd Energy, and various differently sized supply and service companies.

Professional service providers range from New Zealand's largest universities to NIWA and Cawthron, and 2-3 person brokerage, consultancy and legal service providers. The blue tech sector includes the same cast of research entities, operating at times as research providers and at others as prospectors and commercialisers, and extends to small firms launching nutraceutical products, iwi-led start-ups, and Sanford.

Axes of difference also include ethical co-ordinates, which are often shaped by the nature of the capital invested in the business, expectations associated with rates of return, and commitments to local communities and environments. The diversity among forms is not just a question of what they do or their size, but how they do it. We will return to this point below.

7.2. Multiple entanglements

Qualitative research also pointed to the multiplicity and complexity of entanglements among these enterprises and between them and economic actors beyond the marine economy.

In this section we lay out this complexity in two ways:

- a selection of case studies of those entanglements centred on specific enterprises – drawn largely from student research, these diagrams illustrate the messiness of everyday marine economy connectivity and the full range of often unlikely actors and relationships at work as part of the normal day-to-day operation of marine economies
- a selection of standard value chain diagrams at a sectoral level – drawn from material derived from interviews and workshops, these chains impose a particular order on some of these connections between economic actors and highlight key potential points of management intervention to stimulate transitions to a blue economy.

These various mappings of marine economy reveal a deeply entangled set of activities, which we are unable to quantify using existing measurement frameworks and data. They show a complex economy where decisions about investment, production processes, and market development make their way through a complex array of providers and organisations and legal and ethical constraints. Individually and collectively they present a marine economy as a far more complicated object of management than is normally represented.

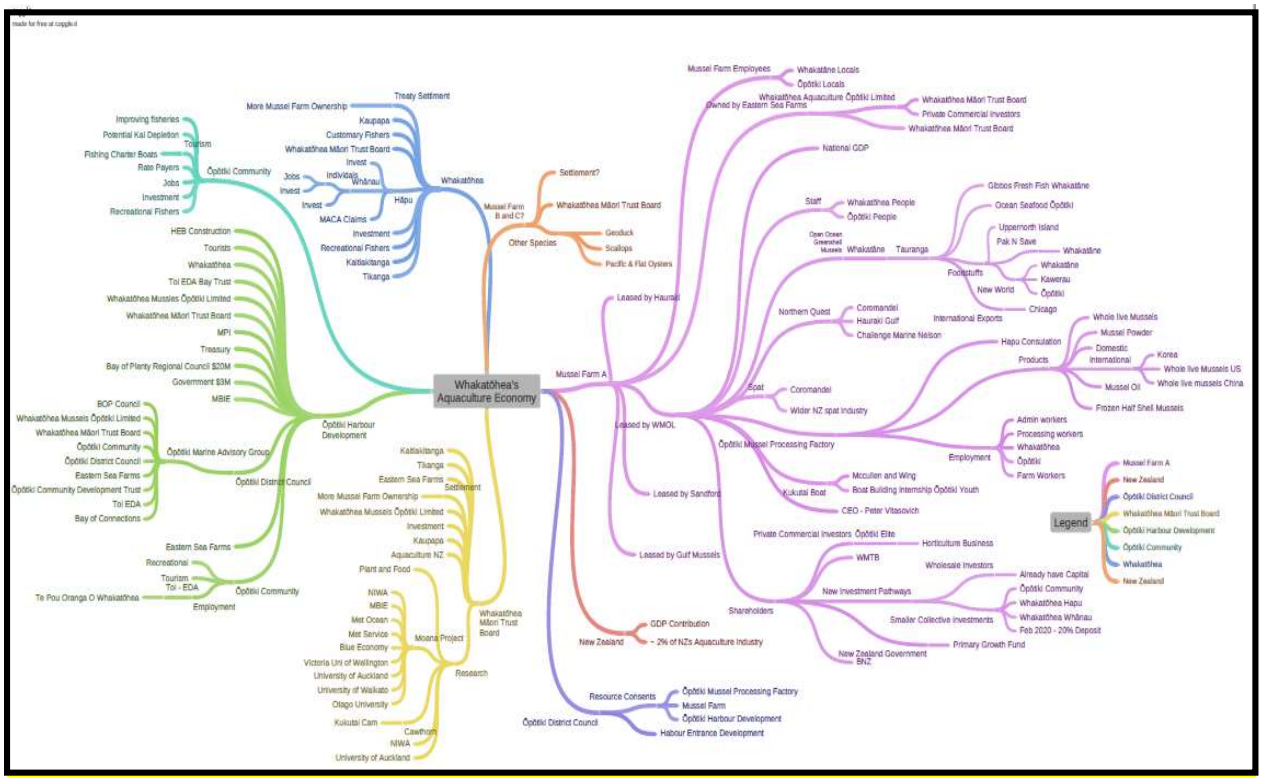
7.2.1. Enterprise level cases

The following case mappings represent some of the complexity of economy on the ground. They are not supposed to be exhaustive accounts of any individual entity, but to be indicative of the complex relations that make up an economy and are always a consideration for management at different scales. They point to multiple sites and moments OF potential intervention that might be leveraged in active management of blue economy.

Whakatōhea Mussel Farm

Whakatōhea's aquaculture space off the coast of Ōpōtiki is a significant configuration of organisations, actors, and relationships in New Zealand's emerging blue economy. It contributes roughly 2% of national aquaculture output and is poised to grow dramatically. Figure 7 maps these actors and identifies eight main clusters of relations in which farming activities are embedded. The figure represents each of these bundles as a key 'branch' of influence and activity in the aquaculture space: Mussel Farm A (Pink), Whakatōhea Māori Trust Board (Yellow), Ōpōtiki Harbour Development (Green), Ōpōtiki Community (Teal), Mussel Farm B and C (Orange), Whakatōhea (Blue), Ōpōtiki District (Purple), and New Zealand (Red).

Figure 7: A mixed customary-corporate, iwi-hapū blue economy



Source: McLellan 2020

Each bundle of relations involves multiple different actors in different ways. A Māori economy, iwi authorities exert direct influence through Te Ao Māori, hapū interests, asset investment and governance responsibilities (blue branch). The Trust Board (WMTB) (Yellow branch) assembles a complex of its own assets, research interest, government funding, external capital, financial control over the aquaculture space and farm space lessors, which it brings to bear on regional aquaculture. It holds a majority shareholding in Mussel farms A, B, and C

Currently, there are three farm spaces at various stages of development. Farm A (Pink Branch) is operated by Eastern Sea Farms, a company owned by WMTB (54%) and Whakatōhea Aquaculture Ōpōtiki Limited (46%), owned by private commercial investors, including WMTB (7.5%). Several other enterprises lease space on the farm. Operations involve a host of suppliers, research entities, subcontractors, and processors. Eastern Sea Farms is currently applying for a resource consent for Farm B (Orange Branch), while WMTB is assembling interested investors in a 5000ha aquaculture space (Farm C - Orange Branch), which is part of Whakatōhea's treaty settlement offer.

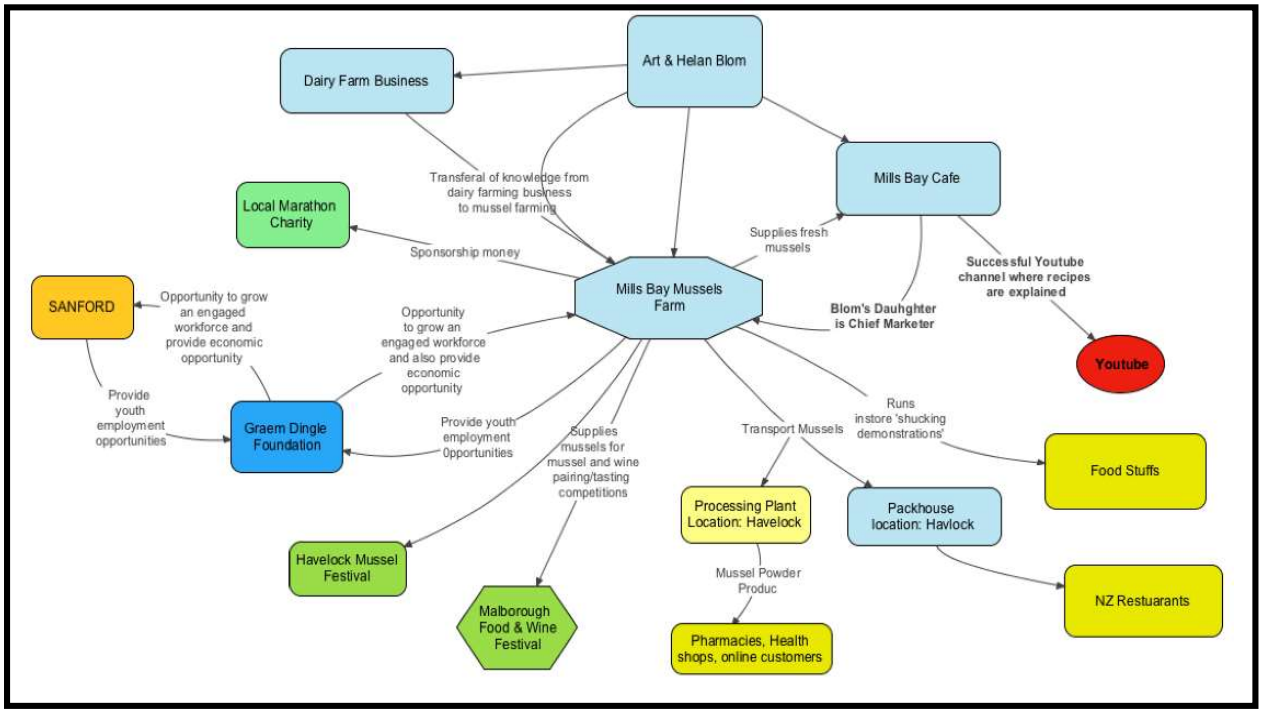
Tourism enterprises are bound into the economy (represented as part of the Ōpōtiki Community, who are also involved in the form of labour and suppliers. The aquaculture space supports fishing charter boats to operate. The Ōpōtiki District Council has regulatory responsibilities in the space. Community actors, the Ōpōtiki District Council, and iwi authorities

are also involved in facilitating the Ōpōtiki Harbour Development, which is set to facilitate the operation of offshore aquaculture and the establishment of a processing facility in Ōpōtiki. The initiative will bind aquaculture to local community development.

Mills Bay Mussels

Mills Bay Mussels is a family owned, integrated tourism-aquaculture venture in Havelock (https://millsbaymussels.co.nz/). The proprietors have a stake in two mussel farms, a tourist lodge, a processing plant, a restaurant and tasting room, and a food enterprise. They take mussel from spat to plate, in their own restaurant, distributed fresh to other restaurant clients, demonstrations of raw shucking in supermarkets and food festivals, or into the homes of mussel eaters through the recipes they design.

Figure 8: An integrated tourism-aquaculture economic configuration



The heart of the enterprise is the eating freshly shucked raw mussel straight from the shell, with the rest of the integrated business model created to operate around this key moment in the travel from spat to stomach. They sell live mussels, premium packaged live mussels, GlycOmega-PLUS Mussel Health Supplement, and meals and tastings.

The business model is deliberately set apart from commodity production and the experience of working on a dairy farm, even the organic farm that the family established in Southland. It is

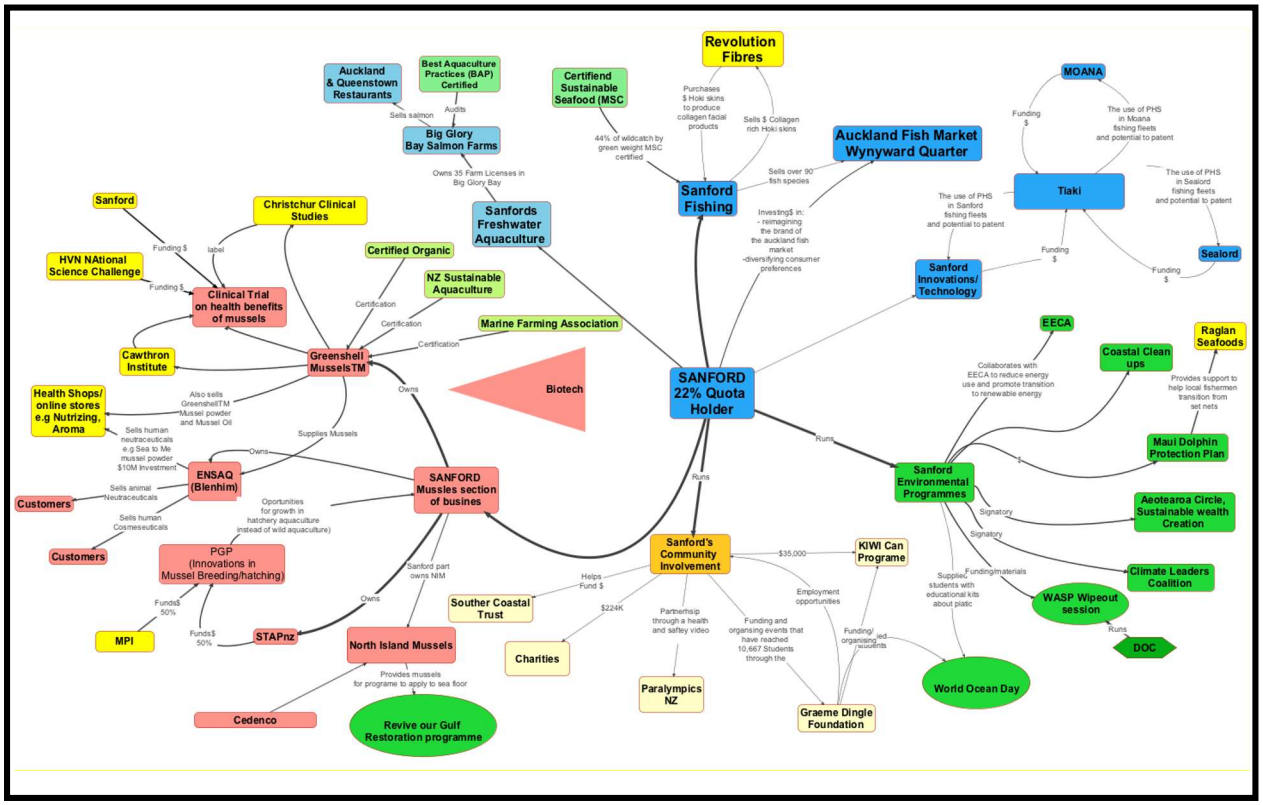
argued to be centred on environmental integrity, sustainability and experience, not volume, and it 'targets the domestic market instead of exports'.

The company adds value through integrating the mussels into a tourism, restaurant and more general food experience, and secures this value through green practices, provenance narratives, community engagement, participation in food festivals, and integrating mussel eating with tastings of Sauvignon Blanc supplied by partner Mud House. It locates itself in place by partnering with the Graeme Dingle Foundation to provide work training and opportunities for youth wishing to enter the marine farming market.

A fully integrated seafood corporation

Sanford is New Zealand's largest seafood company. It owns quota, owns and operates inshore and deep water fishing fleets, buys fish from other commercial fishers, and processes and exports fresh and frozen fish. It also owns aquaculture farms, buys seafood from contract growers, runs farms for growers, processes, packages, distributes and brands seafood. It runs its own research division and has been heavily involved with partners in developing precision seafood harvesting technologies and management systems. It has recently launched a major mussel oil and powder processing and packaging plant, complete with research facilities.

Figure 9: A corporate Seafood actor



Sanford is involved in multiple research partnerships aimed at developing new products from the ocean. Much of this work involves a research configuration of universities, crown research agencies, private companies and government agencies highlighted in red and yellow on the left of map. These groups enable a range of projects to be undertaken.

One example involves the development of clinical trials to test the health benefits of mussels. These trials have fed into the development of a health market for 'nutraceuticals'. Sanford has partnered with other seafood firms, government funders, and research institutions to establish SPATnz, which has developed innovations for mussel breeding and Precision Seafood Harvesting technologies through the national Primary Growth Partnership programme. These relations are also made visible on the left of the map in red.

Sanford also reaches beyond fishing, farming and processing to direct retailing through its Wynyard Quarter seafood market in Auckland, which helps promote the firm and connect its operations to Auckland's amenity and tourism markets. In market development terms, it is also embedded in various forms of accreditation network: the Marine Stewardship Council and 'NZ Sustainable Aquaculture'. It is bound into other relationships and environmental commitments via its participation in the 'Maui Dolphin Protection Plan and the 'Climate Leaders Coalition'. These are located in the bottom right of the map in green.

7.2.2. Value chain schematics

Ordering this enterprise-based complexity into a coherent structure for management commonly utilises three types of analysis: input-output analysis, cluster-based analyses, and value chain or production network analyses.

Input-output analysis is plagued by abstraction and data availability issues at the level of granularity necessary to make the analysis useful.

Cluster-based analyses tend to be centred at regional scales and are used to explore the spatiality of economy and questions of regional development. They focus attention on place-based configurations of enterprise relations centred on a central sector. The Nelson-Marlborough Seafood cluster is one example (Pavlovich and Akoorie 2010).

While cluster analyses using quantitative data are often limited in their usefulness by questions of data quality, the technique can be used to formalise qualitatively derived maps of connection, especially at the sub-regional level. The Whakatohea map above is effectively a cluster map. Further research and analysis building on data collected from this project is planned to examine emerging seafood-tourism clusters in Nelson-Marlborough, Southland, Kaikoura (Lewis et al. 2020), and Whakatane.

Value chains are a widely used technique for organising complex sector-based economic relations into a stable and generalisable form for analysis. The approach focuses attention on the ordering of relations and connections from inputs into production processes to the sale of final goods from those processes. It directs attention to the transformation of goods and to the sites and moments where value is added. It can be adapted to indicate ownership structures, the geography of economic transformation as objects move and value is added, and to signals that return along the chain from purchasers to suppliers.

In this section, we use a value chain approach because of its focus on transformation through production, and thus economy-environment relations. We present five examples of value chains mapped for ecotourism, aquaculture and blue technology. The chains are drawn from material derived from interviews and workshops and demonstrate some of the connections between economic actors at a meso-scale of abstraction.

We use these examples to:

- make visible the extent of the economies assembled around each of the key products in the marine economy (fish, shellfish, marine/coastal experience, and processed seafood products)
- highlight and model the interrelationships in marine economy sectors
- identify sites and moments where economy might be performed differently, new values might be created, and interventions made to stimulate transitions and the creation of new value in a blue economy

The figures below outline simple value or supply chain diagrams for each of coastal ecotourism, wild fisheries, blue technology and aquaculture (shellfish and finfish). They trace relations from material and professional inputs (including regulation and scientific research) and key feedback loops along which signals for transitions might be carried. The connecting arrows identify a series of points of intervention, especially in ecotourism where the product is experiential and production of experiences is far more dialogical; and in aquaculture where operating in the marine commons requires consented space and thus a prior architecture of science and impact assessment beyond the purely technical dimensions associated with production.

Significantly each of the diagrams highlights more points of intervention than are commonly recognised by stakeholders. These are indicated by symbols indicating a potential break in the relationship (//). They vary from points of direct regulatory intervention to signals that carry imperatives from both public and private regulation frameworks to enterprises, signals from publics (consumers, voters, activist groups and media-driven impressions) to enterprises, and direct ethical interventions from investment to consumption.

Figure 10: Schematic value chain: Aquaculture finfish

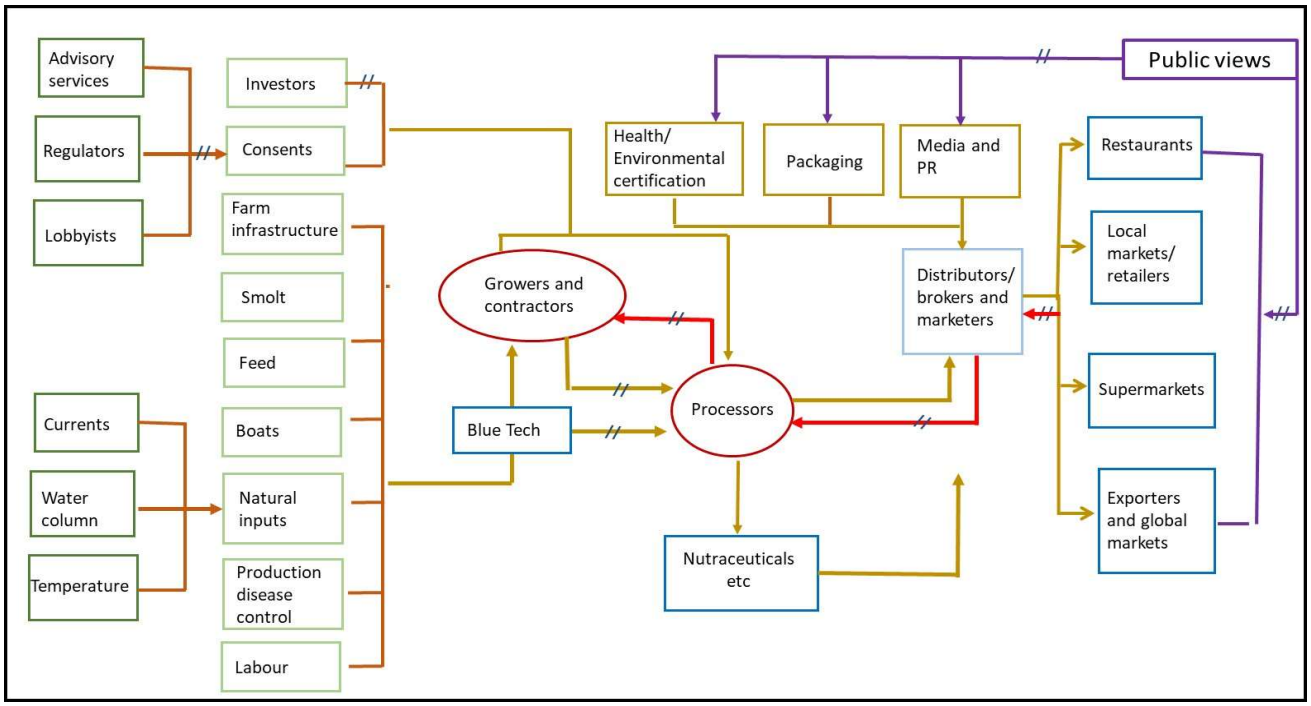


Figure 11: Schematic value chain: Aquaculture/shellfish

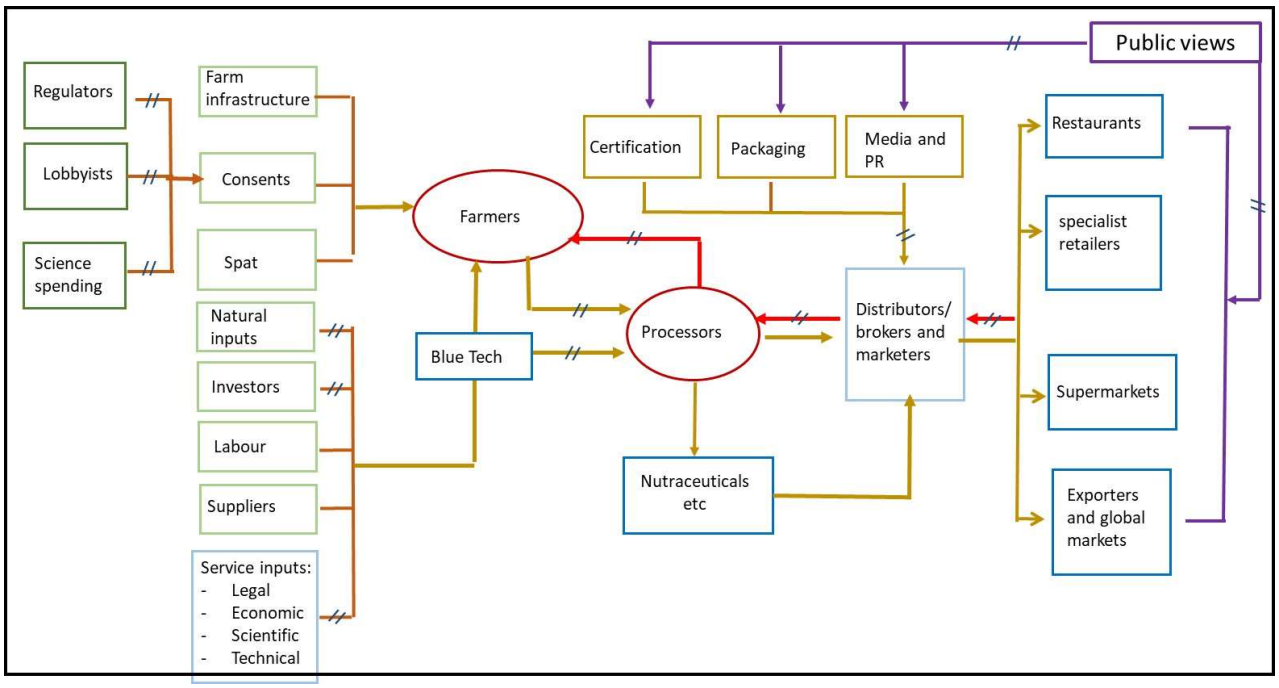


Figure 12: Schematic value chain: Blue-tech

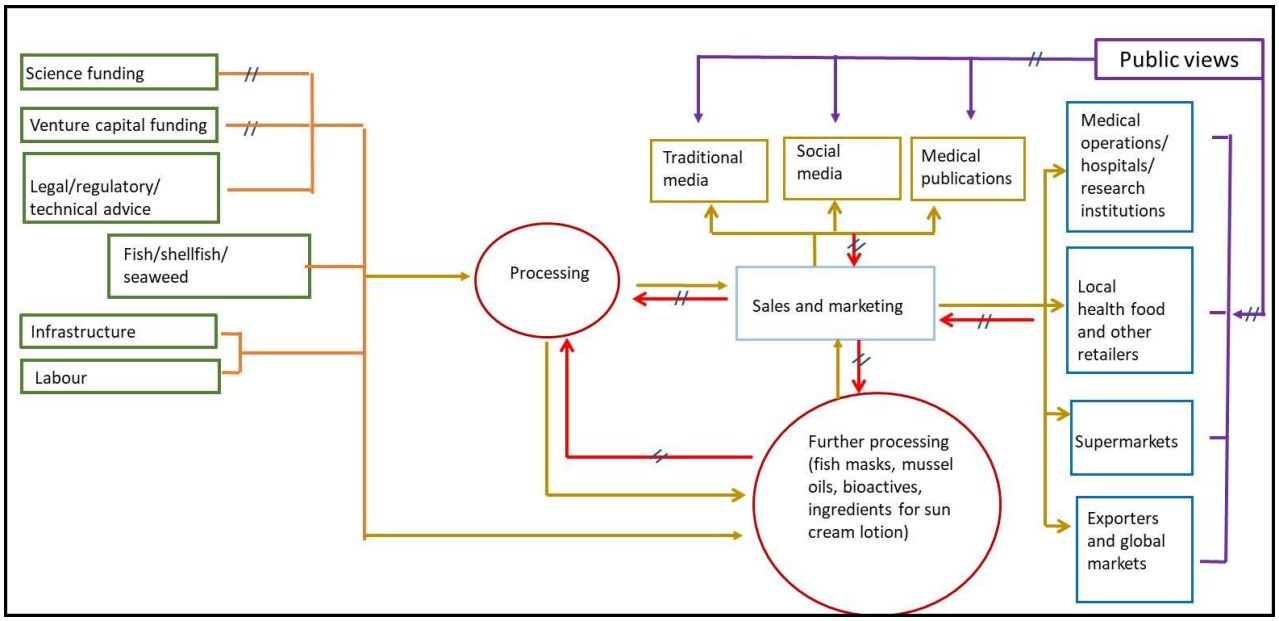


Figure 13: Schematic value chain: Wild fishing

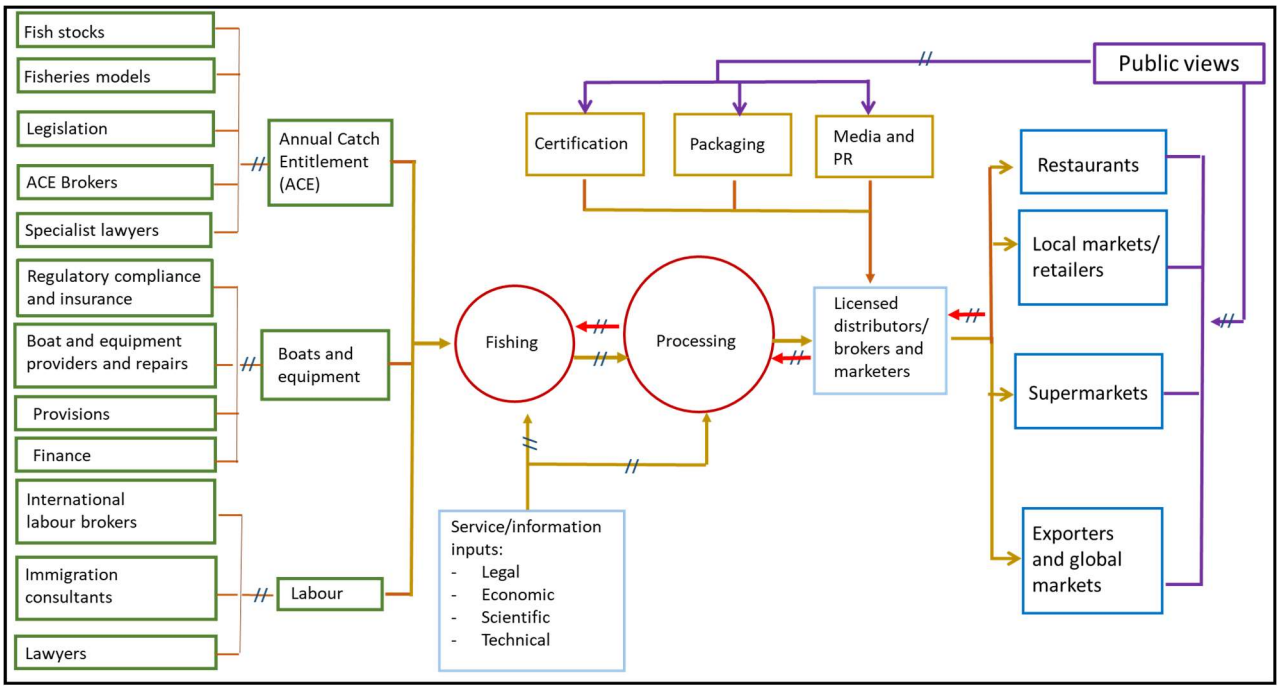
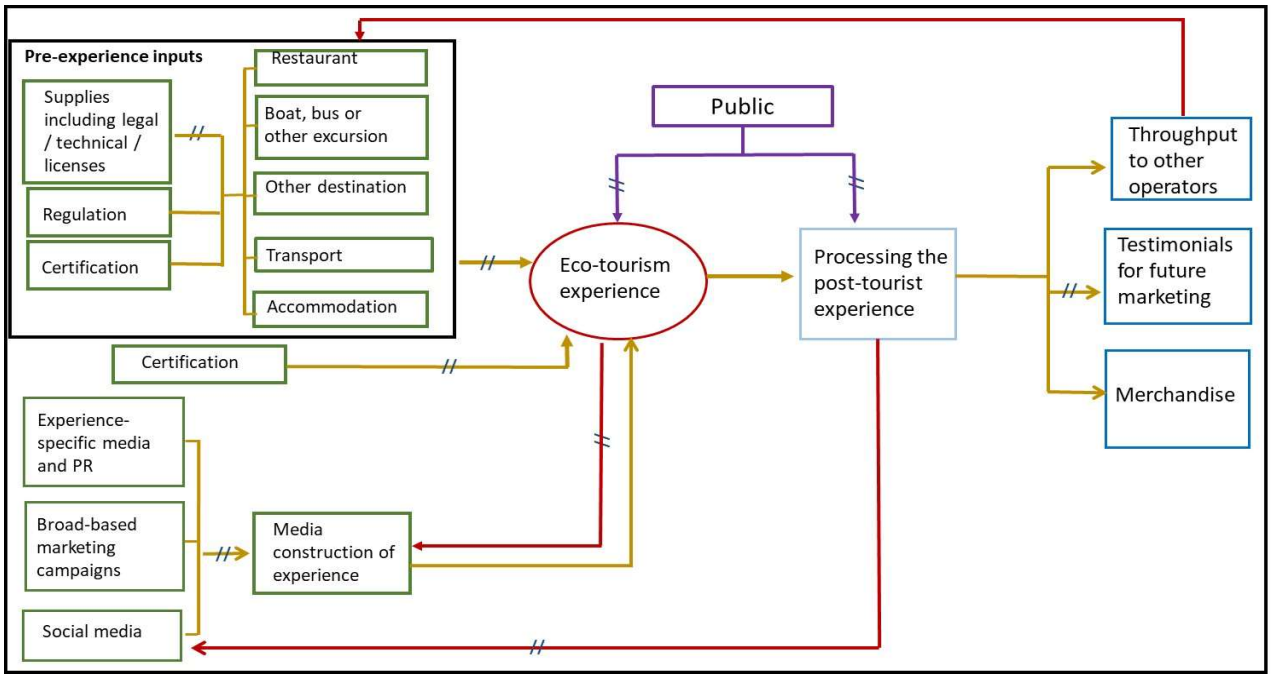


Figure 14: Schematic value chain: Eco-tourism



These mappings again emphasise the breadth of actors involved in marine economies and the extent of the entanglements in community and nation as well as direct enterprise level transactions. They highlight the complexity of economies and what it takes to order them, both points that are missed by representations of economy in terms of outputs and revenue.

The diversity of enterprises involved highlights the point that not every dollar registered in the measures presented in the in GDP-based national income accounts is necessarily of the same value in terms of social and environmental futures at different scales geographically and temporally.

The diagrams highlight the potential for circuit breaking commitments to sustainability by private and public actors. These might take effect through investment processes (green investment, regenerative and restorative investment processes – see Envirostrat 2019); altered relations between corporations and their shareholders, provision of knowledge (consultancy, funded research); enterprise to enterprise agreements; formal commitments among groups of enterprises upstream and downstream (standards, benchmarks and certification agreements); ethical provenance claims (certified or otherwise); and new requirements placed on access to government funding or consenting of activities. They may also involve direct regulation in the form of rules to do with production, consenting requirements, and licences to operate.

Identifying these points of intervention in what are deeply entangled economic relations among different forms of entity located in different places allows us to begin to highlight the BE dimensions of current economy and practice in activity-based terms, to which we now turn.

7.3. Emerging blue economy initiatives

This section presents cases studied in the project as examples of commitments to a future blue economy in Aotearoa New Zealand. That is, within the marine economy, firms and other organisations are already building foundations for an emerging BE. This ranges from innovating with sustainable production technologies to adopting corporate social responsibility to small-scale community-oriented enterprises that organise capital, labour, resources and distribution outside of established market principles. In one way or another these enterprises are making commitments to transform high volume, commodity production into value added products and to set ethical coordinates under which they can embrace concerns with environment and community.

The stirrings identified here celebrate practices rather than enterprises per se, although it is possible to interpret those who launch these practices as BE champions. They are indicative rather than an exhaustive list of what is going on in Aotearoa New Zealand.

The examples are designed to suggest that changes are possible and that some are experimenting with doing things differently, not to suggest that the enterprises are exemplars of BE enterprises or somehow represent the end goal of a disposition to BE. Nor do we suggest that a defining transition is underway or that the end of such a transition can be already known.

The practices we identify may have contradictory dimensions, and those launching them may also be involved in contradictory practices. Our approach is to highlight and celebrate experiments, rather than to measure the truth of any motivation or effect. We do this deliberately to reveal these practices and encourage and normalise further experimentation by all actors from consumers to retailers, market intermediaries, regulators, producers, investors, shareholders, and voters.

Significantly, many of these cases are being adopted by enterprises as part of strategies to add financial value to their products. This indicates an increasing consolidation of concern with blue economy principles among all economic actors from the shareholder to the voter, regulator, and consumer. Several of the cases also indicate commitments to prioritise and add values other than those reflected in higher prices and financial returns on investment. Prioritising other values without seeing these practices as trade-offs, is doing economy differently.

7.3.1. Corporate social and environmental responsibility

Corporate social and environmental responsibility (CSER) refers to policy and action adopted voluntarily by companies to enact and communicate corporate values and associated shareholder commitments. These policies and practices enact a mix of commercial imperatives

and ethics. Many Aotearoa New Zealand seafood and other marine economy companies make such commitments on their websites and highlight practices that fit beneath the label.

Most initiatives considered in this Section of our Report are presented as CSER in one way or another by the enterprises involved. All major Maori enterprises make CSER commitments and ground them in mātauranga Māori and related ethics and governance practices. Sanford, Aotearoa New Zealand's largest seafood operator has gone further than most large non-Māori operators in formalising their CSER (https://www.sanford.co.nz/).

Sanford is a fully integrated international seafood corporation and prominent in aquaculture, fisheries and blue technology. It is credited with leading the Marine Stewardship Council (MSC) certification for the Hoki fishery, which introduced a mainstream seafood sustainability culture in Aotearoa New Zealand. Over the last ten years, it has also led the development and introduction of precision seafood harvesting technologies, which aim to radically reduce the environmental impact of commercial fisheries.

In 2013, Sanford appointed CEO Volker Kuntzsch, in part to strengthen its commitment to 'sustainable seafood' (Sanford Ltd Media Release 30 August 2013). Kuntzsch led a major CSR drive. He commissioned an Annual Report in 2014 that produced the first Integrated Report globally in the fishing industry and only the second Integrated Report in New Zealand.

In 2015 , the Annual Report reported the company's performance against its business plan focused on four areas: optimising the quality of the resource that they harvest; enhancing their brand's reputation and truly living their values; consistently producing seafood of the highest quality; and creating a work culture of innovation and customer service.

By 2019, Sanford's annual report reported against six performance outcomes: ensuring healthy oceans and protecting and enhancing the environment; creating a safe and high performing workplace; leading the way to healthy food and marine extracts; supporting strong communities and partnerships; delivering consumers' expectations; and building a sustainable seafood business. It measured its performance in terms of value creation in six domains of capital: financial, human, manufactured, intellectual, natural, and social.

The point for this Report is that the company is normalising attention to environmental and community goals. Our aim is not to measure the truth of their claims or evaluate their performance. Rather, it is to show that the firm has signalled a commitment to blue economy, invited scrutiny of that commitment, and committed to evaluating its performance in those terms. This issues a major challenge to others as well as its own executives and shareholders.

7.3.2. Environmental certification and branding

Environmental certification is a widely advocated approach to encouraging environmentally and socially responsible economic activity – from investment to production practices and value

chain development. Aotearoa New Zealand marine enterprises have widely embraced environmental certification as a basis for demonstrating corporate social responsibility and regulating themselves in relation to environmental concerns for a mix of commercial and ethical reasons.

Aotearoa New Zealand's Hoki fisheries were the first major fisheries in the world to be certified as sustainable by the Marine Stewardship Council (MSC), which is accepted as a global leader in certification labels that drive sustainable seafood practices. Another six fisheries are now also certified by the MSC, including three of the New Zealand's iconic Orange Roughy fisheries.

Seafood New Zealand also reports that there are 29 certified MSC Chain of Custody suppliers in Aotearoa New Zealand, and 50 percent of New Zealand's wild-caught seafood harvest is MSC certified. With more than 75 per cent of New Zealand's deepwater species either MSC certified or under assessment for MSC certification

There are clearly opportunities to improve these figures, but they again represent the normalisation of sustainability and a level of commitment to fishing sustainably.

In 2017 Moana New Zealand (https://moana.co.nz/), one of the country's largest seafood operators and its largest Māori operator, sought and achieved Aquaculture Stewardship Council certification for its Abalone farm. The accreditation is for responsible aquaculture production (including best farming practice and environmental responsibility).

The much smaller Okains Bay Seafood (https://www.okainsbayseafood.co.nz/) promotes itself and markets its products behind a series of interlinked sustainability initiatives: a commitment to long-line fishing; a biodiesel vessel; whakapapa – a whānau based and intergenerational business model; a seabird protection programme; and QR code traceability and provenancing of its catch. Its biodiesel vessel is one of four inshore fishing vessels operating out of Lyttleton Harbour supplied by Green Fuels (https://greenfuels.co.nz).

Aquaculture New Zealand's A+ sustainability audit programme sets sustainable aquaculture standards aligned with international accredited certification programmes, such as ASC and Best Aquaculture Practice. It reports publicly on the industry's performance against these standards and formalises a cycle of continuous reporting and review, which is argued to establish a platform for enhancing 'sustainability aspirations' (AqNZ 2020 http://www.aplusaquaculture.nz/sustainable-aquaculture).

New Zealand's largest salmon farming operation, King Salmon (https://www.kingsalmon.co.nz/), has committed to A+ as well as the sustainability goals of the Global Salmon Initiative, four independent global aquaculture certifications (including ASC), ten of the UN Sustainable Development Goals, and various fish welfare, community development, local environmental sustainability initiatives, including working alongside local iwi.

Westhaven (http://nzcockle.co.nz/), a cockle fishing and processing company in Golden Bay, has invented its own certification 'safe sustainable seafood', drawing on references to the QMS as a framework for responsible fishing. While novel and not backed by independent audit of its own practices, the firm has invested in ecological research in Golden Bay to self-limit its activities and establish long-term sustainable practices in a place-specific fishery. It can also point to its significance in providing local livelihoods and community engagement.

Seafood New Zealand has established an overarching promotions campaign based around six pledges. Positioned on the opening page of its website (https://www.seafood.co.nz/), the promises address concerns from social justice to environmental performance underpinned by a unifying commitment to honesty and integrity. They include a pledge to minimise impacts on the marine environment, work with government and others to ensure the sustainable use of fisheries, and to be accountable to its pledge list in a transparent manner.

While its pivotal accountability pledge has yet to be tested and the pledge list does not outline the consequences for any member who breaks their promises, the initiative sets up an architecture for private regulation in blue economy across the sector.

7.3.3. Green production technologies

Multiple fisheries and aquaculture firms are introducing technologies to address sustainability issues, from biodiesel vessels to long-lining technologies that aim to protect benthic environments, sea bird protection tools, on-boat camera equipment that registers efforts to reduce by-catch, and energy-use reduction technologies in aquaculture and lobster farming. Perhaps the most celebrated of these technologies is the Precision Seafood Harvesting programme heavily supported by government and involving Sanford, Moana New Zealand and Sealord. The emblematic Tiaki Modular Harvest System (http://www.tiaki.com/) offers solutions to sustainability issues to do with size, species composition, benthic impacts and protected species. The approach has become its own sustainability benchmark.

7.3.4. Circular economy initiatives

Circular economy initiatives involve environmental sustainability-oriented activities that pay close attention to utilising or economising waste streams and low growth solutions in resource economies. They are attracting attention among operators in New Zealand's marine economy.

These include recycling fish waste into pet food or feed for fish farming, and recycling mussel shells produced by the more than 20-fold increase in mussel production over the last 30 years into various applications of calcium carbonate. Havelock Shell Processors (http://www.havelockshellprocessors.co.nz/about-us.html), for example, crush mussel shell waste to produce material of various grades for a range of purposes, including fertiliser, poultry grit and landscaping.

One successful example of circular economy is Waikaitu (https://www.waikaitu.com/), a small bio-stimulant and agricultural fertiliser company based in Nelson. Waikaitu makes plant and soil care products from wild harvested *undaria pinnatifida*, a 'nutrient-dense brown seaweed' that is classed as an invasive species in Aotearoa New Zealand.

Waikaitu receives acquires undaria from mussel farmers. It processes an environmental pest and unwanted by-product growing on mussel lines into organic products with superior yields to traditional fertilisers. In so doing, it displaces the use of harmful chemicals in terrestrial farming, supports local farmers to deliver on environmental commitments and earns export revenues.

This relatively simple circular value chain removes invasive species, pests from mussel lines, and reduces unwanted discharges from land into coastal environments. Beyond this circulation of value, Waikaitu is embedded in several networks of economic relations – viticultural and agricultural firms who are seeking environmentally certified fertilisers and disease repressants, networks bound together by specific certifications such as BioGrow, the government-centred marine and agri-scientific industrial research complex, organic agriculture networks of researchers, advocates and committed users, and the emerging seaweed aquaculture sector.

Elsewhere, regenerative footwear company Subs is recycling plastics gathered from the ocean into jandals, which it sells on global markets behind a powerful narrative of circular economy (https://www.subs.nz/). For every pair sold, the Canterbury company pledges to remove half a kilogram of plastic from the oceans. When the jandals themselves wear out, customers can simply send them back to Subs for recycling.

At the other end of circular economy practice, Free Fish Heads (https://www.freefishheads.co.nz/) operate a community-centred, non-commercial circular economy. Supported by recreational fishing organisation LegaSea, the initiative runs a website that brings together fishers who do not wish to keep and consume their fish heads and frames after a day's fishing with members of the public for whom what would otherwise be waste represents a nourishing and culturally meaningful meal (Sharp 2020b). The practice creates a range of social and environmental values, including reducing waste and potentially relieving pressure on fish stocks.

7.3.5. Regenerative economies

Regenerative economies are environmentally focused assemblages of resource use, production technologies and practices, investment protocols, circular economy motivations, and certification procedures that are designed to promote the self-renewal capacity of underlying natural systems (Morseletto 2020). The idea has been taken up by environmental business networks in Aotearoa New Zealand such as Pure Advantage and the Sustainable Business Network, as well as more organically among committed enterprises.

AgriSea is one of those businesses (https://agrisea.co.nz/). Its business model is founded on regenerative principles (albeit the regeneration of soils rather than ocean ecosystems).

Stimulated by experiences on farms where they worked, the original proprietors Jill Bradley and Keith Atwood experimented with seaweed and organics as natural alternatives to fungicides on their own lifestyle block in the early 1990s. They started a business in 1996, which today sells seaweed health and beauty products as well as organic alternatives for urban home gardens.

AgriSea was founded in 2004 with the aim of extending the seaweed operation into a biological agriculture enterprise. The business is family-owned and run, and partners with local communities, coastal whānau, hapū and iwi across Aotearoa New Zealand to gather beach-cast seaweed. The business grew on the back of extensive scientific research into biodynamic agriculture. Now with a staff of 28, AgriSea processes seaweed into products to supply the horticulture, agriculture, apiculture, viticulture and dairy sectors with a variety of organic seaweed-based products.

The second-generation proprietors of AgriSea, Clare and Tane Bradley, have won national community impact and sustainable business awards. Confirming a reputation for championing the principles of circular and regenerative aquaculture, AgriSea hosted the GreenWave regenerative aquaculture workshop in September 2020. The initiative is the most explicit project yet to develop regenerative economies in Aotearoa New Zealand's marine spaces (see Section 10.3.1).

There are also argued to be major opportunities for regenerative tourism, which actively revitalises the health of the natural, social and cultural elements and interactions with the ecosystem within which it occurs (https://pureadvantage.org/news/2020/07/31/regenerative-tourism-opportunity-for-tourism-recovery/). Research commissioned by the Parliamentary Commissioner for the Environment (PCE 2019; Higham et al. 2018) called for a radical new sustainable tourism paradigm that alters consumer demand as well as delivering higher value, sustainable products and a new regulatory apparatus. National conservator and manager of the ocean conservation estate as well as a tourism enterprise in and of itself, DoC is itself a vocal supporter of regenerative tourism (Becken, 2020).

Kaikoura based Whale Watch is internationally acclaimed for its sustainable tourism model. It bases its business on the Kaikoura Whale Sanctuary, a conservation resource that the company works hard to support and revitalise directly. Whale Watch talks of forming 'a sustainable relationship with Kaikōura's entire ecosystem' – ki uta ki tai (mountains to sea). It is committed to preventing any harm to the ecosystem 'that keeps the whales close to Kaikōura'.

Elsewhere, Dive Tutukaka (https://diving.co.nz/) operates a regenerative tourism model – supporting a local community that in turn supports the maintenance of a marine reserve that provides sites for diving. The marine reserve is actively regenerating local and surrounding ecosystems. Dive Tutukaka is a vocal champion of the Poor Knights Islands Marine Reserve, and

marine reserves more widely. Proprietor Jeroen Jongejans enthusiastically argues that every time someone buys their products (a diving adventure, accommodation or a meal) they're contributing to the preservation of the ocean and the protection of the marine environment. He advocates strongly that the economic return from his enterprise is significantly greater than what would be achieved from fishing it directly, and that strategically positioned marine reserves aid recruitment and have positive impacts on fishing in surrounding waters (recreational and commercial).

In the Hauraki Gulf, community group 'Revive our Gulf', is building mussel reefs. Made up of scientists, mussel farmers, donors and community members and supported by DoC, Fisheries New Zealand and North Island Mussels (a joint venture initiative involving Sanford), 'Revive our Gulf' has been putting mussels back into the Gulf to regenerate shellfish beds and rejuvenate the wider ecosystem. The commercial pay-off will come in tourism and aquaculture and fisheries, as well as the fostering of wider blue economy values and environmental well-being.

7.3.6. Innovative regulatory approaches

Aotearoa New Zealand has experimented with participatory environmental decision-making processes that shift responsibility and authority for economic decision making to local communities (Le Heron et al. 2019). Aligned closely with commitments to co-governance solutions, these processes have meant that economic decisions have been made in living laboratories that have explored and determined 'who gets what, why, how, for how long, and to what ends'.

These initiatives include Integrated Kaipara Harbour Management Group, Sea Change Tai Timu Tai Pari, Gift Abel Tasman Beach, and Te Korowai o Te Tai ō Marokura. They have paved the way for prioritising cultural, community and environmental values and built economies around those priorities (Le Heron et al. 2019). They have demonstrated that economy can be done differently, especially in the context of common pool resources (see Appendix 1).

These examples have shifted understandings of environmental and resource management as well as economy. They prefigure models of blue economy.

7.3.7. Collective initiatives in economic development

In seafood and related economic activities such as recreational fishing, Aotearoa New Zealand sector interests have established multiple collective interest organisations or industry lobby groups that exercise associational governance within the marine economy.

Key bodies include Aquaculture New Zealand, Seafood New Zealand, Fisheries Inshore New Zealand, and the Marine Farming Association. Other associations exist at different scales – both

supra-national and sub-national. Other users of ocean resources also have industry voices such as Ports of New Zealand and the Petroleum Exploration and Production Association of New Zealand. Other user groups include recreational fishing lobbies such as the New Zealand Sport Fishing Council. Te Ohu Kaimoana represents and works to advance Maori interests in the marine environment, from customary uses to commercial and fisheries and aquaculture.

These organisations commonly represent a defined set of commercial or special interests, but each also exercises a degree of influence over their members. Each also recognises the collective value for their members of improved environmental practices and acts to secure those collective interests by influencing the decisions of individual members.

The various collective bodies are involved in promoting many of the initiatives documented in this section, most notably certification, branding and new production technologies. Most also oversee codes associated with employment relations and promote social responsibility.

There are also, of course multiple environmental groups that voice concerns about economy-environment relations. These exist at scales and levels of formalisation from international agencies such Greenpeace and the Nature Conservancy Council to informal local guardianship groups.

The point we make here is that these agencies represent already existing sources of transitioning initiatives and are already generating initiatives from moral suasion to formal commitments such as those to conservation initiatives around sea mammals, bycatch and so on. Our research was not designed to document these initiatives, but we did encounter collective initiatives that are more enterprise centred, more spontaneous, more linked to business that is not normally understood to be usual, and more focused on the question of redistribution of economic rents derived from marine commons that allow for community and environmental gains (a point we take up later).

These include a localised example of aquaculture interests seeding mussel spat into the wild, the rahui placed by iwi on seafood gathering around Kaikoura after the earthquake, the collaboration of joint venture North Island Mussels in providing mussels to support the mussel bed rejuvenation work of the Mussel Reef Restoration Trust and its Revive our Gulf initiative, and the donation of 160ha of 'water space' by a consortium of aquaculture interests to the Golden Bay Community Trust.

The latter example, while clearly tied to 'buying' a social mandate and thereby a regulatory consent to develop, is particularly interesting as a model for returning economic rents to local communities. Akin to the allocation of consented space to Maori under Treaty rights legislation as part of all aquaculture consenting, it recognises community claims to the commons and the rents associated with the commons. We take up this point in Section 10.3.5.

7.3.8. Māori leadership

Māori entities and Māori businesses have led many of the emergent examples of blue economy (Reid et al. 2019). Māori businesses are prominent in the examples above. Kono, which describes itself as an artisan producer and a vertically integrated, family-owned Māori food and beverage producer (https://www.kono.co.nz/), succinctly summarises the philosophy that leads Māori to lead blue economy initiatives and to offer the substance of a future blue economy:

> '*We consider ourselves to be kaitiaki or guardians of the resources. The value of kaitiakitanga is that it recognises that we are responsible for the health and vitality of our land, waters and resources. Not only now, but also into the future. We manage what we consider to be our ancestral treasures in a sustainable way that creates opportunities for growth and prosperity'.* (https://www.kono.co.nz/sustainability#sustainability-2)

Māori tourism and seafood entities also begin from what Moana New Zealand describes as a sustainability journey that goes 'above and beyond what is required of us by law', a commitment to social as well as environmental sustainability, a 'uniquely long-term view of everything', a guarantee of 'true provenance' grounded in centuries of being in place, and the principles of 'kaitiakitanga, manaakitanga, whakapapa, and whakatipuranga' (http://moana.co.nz/wp-content/uploads/2017/09/MOA-1739-External-Sustainability-Journey-2017-f.pdf).

Māori business entities such as Kono are leading interests in bioprospecting and blue technology. They are doing so from a platform of mātauranga Māori. Whale Watch leads ecotourism initiatives in blue economy.

We outline dimensions of Māori economy in Section 8.4.5 below.

7.4. Pressures to do things differently and barriers to change

Our goal in this section of the Report has been to shift analysis to the enterprise scale at which transitioning must occur through practice. We have sought to highlight the diversity of enterprises at work and some of the key connections among them, and we have identified multiple enterprises that have sought to align their practices with blue economy principles.

Our approach has been to identify indicative practices. Many other enterprises are launching similar initiatives in sectors from coastal tourism to deep ocean fishing. Our point is to highlight *the importance of identifying and seeking to stimulate blue economy at the enterprise and activity levels*.

These emerging blue economy initiatives establish multiple courses for change. This course is stimulated in part by the recognition of external pressures, but in large part by ethical commitments. Many of those with whom we talked pointed to the inevitability of change

emerging from pressures exerted by government, shareholders and financiers, domestic and global consumers, international conventions, trade partners, tangata whenua, community/environmental organisations at all scales, and wider public voices. These pressures have distinctive forms (Table 3).

Table 3: Pressures to do things differently

Domain	**Pressure**
Political	Current government is seeking to redress narrow export-led growth agendas with commitments to environmental and social well-being Introduction of participatory and co-governance decision making
Legal	Co-governance regimes and Treaty considerations offer opportunities-focused pathways through legal and regulatory complexity
Social	Changing consumer preferences and public commitments to co-governance management approaches offer new returns on commitments to livelihoods, community, and compromise driven solutions to resource conflicts
Industry	Existing businesses adopting 'greener' technologies and value-added products such as nutraceuticals; Māori economy is encouraging new commercial practices and social-environmental values. Champions and networks focus on green performance through environmental monitoring, resilient business models, and certification
Technological	Technology promises new value added and green products and processes
Environmental	Climate change, ocean plastics, sedimentation, degradation, loss of species place pressures on consumer preferences, regulation, production practices, opportunity sets, business risks

Source: Adapted from Envirostrat 2019

These pressures together with specific commitments from specific actors, especially Māori entities, present a platform for a blue economy. They echo views expressed in our interviews and workshops, where we worked with agency managers and advisors at different levels, industry figures in different industry spaces (size, sector, region, global/local orientation), Māori economy actors (from whānau to pan-iwi bodies), community groups and so on. The views they expressed about economic futures were diverse, within and across these categories of actor.

We found that in general (see Table 4 for summary):

- proprietors and officials of smaller firms have diverse and locally focused views, employ local people, and tend to treat growth as an outcome of sound business practice and creative entrepreneurialism, and one that is open to ethics that will allow them to chart their own course

- representatives of larger firms and those with specific responsibilities (from CEO to divisional head) tend to be transactional, seeing: growth as the primary objective (within environmental limits set by regulation and consumer demand); local community relations as externalities or constituted through formal programmes (sponsorships etc); and environmental relations as technocratically framed
- firms involved in intermediary activities (consultants, brokers and so on) tend to hold more transitional dispositions than those involved more fundamentally in production or sale – in part this is their change-making roles in value chains and business ecosystems, and in part it is a feature of ethical dispositions
- representatives of industry organisations had strong growth-focused message lines, reflecting their interpretation of their responsibility to members
- government agency perspectives are split between technocratic views locked into views conditioned by instrumentality, growth, abstraction around policy settings, and rules imposed downwards; and longer-term commitments to thinking outwards from the substantive concerns of agencies (fisheries, aquaculture, and conservation)
- iwi representatives and/or those representing Māori commercial entities had a mix of specific commercial interests and commitments to rights, longer-term interests and environmental and community vitality and regeneration

These findings are summarised and organised by type of actor in Table 4.

Table 4: Perspectives on marine economy futures

Economic actor	**Perspective on economic futures**
Smaller firms	Diverse and locally focused – growth as default view of development
Larger firm officials	Transactional view of sustainability and community – growth within limits and or with community/environment programme as the primary objective
Intermediaries	Transitional dispositions – policy and change advice is good business
Industry organisations	Strong growth within limits focus
Government agencies (central)	Technocratic – instrumental, policy-setting and rules focused, abstraction oriented Actor oriented – relational, substantive concerns
Local government	Transactional – need tools and solutions to planning contests and decision making
Iwi and Māori enterprise	Inter-generationality, kaitiakitanga, measured innovation, rights and interests (marine resource commons) … blue economy

These various pressures represent fertile ground for transitioning to a blue economy. Notwithstanding selection biases (those with no interest in establishing a stake in notions of blue economy did not take part in our research), as individuals everyone with whom we talked voiced the importance of paying more attention to ecosystem wellbeing. Many also embraced ethical and political commitments to environmental and social justice.

Most participants accepted the proposition that Aotearoa New Zealand must move beyond growth within limits approaches. They recognised the urgency and unavoidability of external pressures for change and welcomed an ethos of doing things differently.

Led by the champions we identify, many recognised in one way or another the key elements of blue economy futures that we take up below: community and environmental orientation of enterprises, participatory regulation, place and the distribution of rents, win-win solutions, value adding, and ecological well-being.

Consciously or otherwise, research participants generally shared the starting premise of Sustainable Seas - business-as-usual is becoming increasingly untenable. *Enhancing the use of marine resources must mean something more than growth per se.* This perspective challenges existing policy frameworks to understand the use of marine resources in terms beyond those defined by output and revenue measures alone.

For some, however, this is not necessary. An axis of interest among those focused on growth frames the challenge as *growth within new limits*. This view aligns with established nation-centric approaches to decision-making, traditions of productivist and export-led growth, economies of scale approaches, and adversarial forms of resource management.

This business as usual approach *restricts imagination and obstructs transitions to a blue economy*. It hides from view other possibilities, including those already being championed.

This Section has aimed to disturb the taken for granted nature of this imaginary in four ways.

(1) presenting established sector analyses in less familiar ways
(2) digging down to reveal the diversity of enterprises and the different entanglements that define economic enterprise
(3) revealing initiatives that are attempting to do economy differently
(4) shifting discussion to possibilities of doing otherwise

As we approach the end of 2020, determination to utilise marine resources to achieve a post-Covid recovery should provide a foundation for doing things differently in a successful blue economy.

8. Rethinking Marine Economy as Blue Economy

Now it gets tricky. The growth agenda remains strong in government and industry lobbies, while legislative and regulatory complexities, intensifying environmental and business uncertainties, and an underdeveloped policy, research and institutional architecture make change risky and difficult to operationalise. Disruptive change will require new conceptual tools and approaches.

In the following sections we offer a conceptual and practical architecture for doing marine economy differently. This is made possible by engaging at length over an extended period with key economic actors (businesses, stakeholders, Māori and government agencies). The challenge is to take a deep breath, disengage from the mix of complexities that so often turn into a wall of impediments, and think about how to enable possibilities.

All this is not to say we expect all those involved in New Zealand's marine economy to accept or welcome this analysis. The language of growth (within limits or otherwise), trade-offs, and the logics of economies of scale are well-entrenched, as is the belief in private property rights as a platform for efficiency and just outcomes. Business as usual is in the interests of some, while pursuing change in response to key questions about the future is not immediately or obviously rewarded.

We proceed from the position that positive change must involve reconceptualization and imaging new institutional approaches and ways of doing things, if only because they open up possibilities that need to be debated.

8.1. An agenda for constructive disruption (creating value in a blue economy)

Our agenda is to *re-think and remake marine economy as blue economy understood as place-centred, relational, and just*. This will involve *a journey into collective thinking and action*, recognising where and who we are in the world, and reviving the explanatory and political value of the old but powerful economic concepts of economic rent and commons.

The premises and propositions outlined in Sections 4.2 and 4.3 demand an approach to creating value in a blue economy that *contributes directly to ecosystem and community health*. In this section, we ask what this means in terms of reinterpreting marine economy for management and governance in Aotearoa New Zealand. That is, we portray marine economy in unfamiliar terms as the first step in grasping *the blue economy moment* as an opportunity for disrupting business as usual. To do this, we draw on:

- our three underpinning disruptive conceptualisations of the nature of economy (Section 3.1);

- our field research, which reveals a diversity of practice and entanglement, but does not fit neatly into existing sectoral boxes;
- a literature that focuses attention on economisation and market-making, or the importance of how economies are stitched together and made to work in the real world (see Berndt et al. 2020; Prince et al. 2021)
- a well-established literature on the social (cultural and political) embeddedness of economic activities, which in relation to natural environments and resource economies we understand as *economy-environment relations*

Our aim is to extend the object of economic management from sector-based export figures and the concern with productivism that lies beneath them to economy-environment relations, which underlie understandings of blue economy.

8.2. Disaggregating from a sector / stakeholder model: Agency in a real marine economy

The sections above have discussed the wide range of commercial and non-commercial users of marine resources, but we have directed little attention to the other actors in contemporary marine economy. On the ground, Aotearoa New Zealand's marine economy comprises an extraordinary diversity of people, organisations, and relationships. Our workshop-based research interested actors from government agencies to environmental NGOs, iwi and hapū organisations, whānau-based enterprises, kaitiaki, and professional service and research organisations.

This diversity is not captured in standard representations of economies that abstract away from people and specific agencies to consider them as consumers, workers, government, or 'the community' in an oversimplified reading of their values and agency. The agency of actors is generally interpreted in relation to the market. A firm is a firm (bounded organisationally, and in time and place), a worker is a worker, a dollar is a dollar, regulation is obstructive, and economic agency is universal and centred on maximising behaviour (profit, utility, efficiency).

The point is important because economies are represented in idealised terms. People only appear in terms of their market transactions and their action is understood as pre-formed and maximising. Real world markets and economies are comprised of a complexity of real people and agencies. This is far from a novel observation, but is crucial if we want to understand the culture and politics of economy in a way that allows us to think through transitions towards different worlds and to create value in the complex intersections between culture, politics and economy, or people, government, and markets (investment, production, labour, or goods).

In the case of marine economies, the point is even more important. Marine economy is centred on common pool resources, meaning that communities and local and central government

agencies and iwi authorities have an enhanced significance as interested social and cultural users, regulators, investors, and environmental stewards.

The marine economy takes form from the actions and interrelations of many people and social bodies (as well as non-human actors such as fish or parasites in aquaculture), the institutions that shape them, and the complex legal framework that scaffolds over them.

Table 4 lists the main agents at work in a marine economy – from individual and social actors, to formal organisations (government, industry, iwi and other Māori representative organisations, and stakeholder representatives of other users). They include multiple types of business enterprise.

Beyond obvious commercial entities, community residents create and derive values – from passive amenity, to recreational use values, and cultural and spiritual values. Investors, entrepreneurs, government officials, workers and formal advocates are also always people who are making and deriving other values. At the same time, fishers, boaters, tourists and recreationalists are workers, consumers, and commercial users of 'marine resources'.

Government agencies are actively involved in mediating resource use contests, regulating uses, and funding research and innovation. They take many different forms and have different responsibilities and agendas. The policy framings and rules set and administered, along with associated investment by MPI and MBIE in regulation, market development research, science for product development, for example, lie at the core of much of the marine economy.

Central government agencies are crucial actors in organising access to resources (including labour), regulating practices, supporting research and development, developing markets, and so on. Local and Regional Government oversee legislation and set the plans that guide environmental management an access to resources.

Table 5: Marine economy actors

Key Actors in marine economy
Tangata whenua (customary users, owners of Māori commercial entities)
Eaters, consumers, submitters, voters, sailors, sea lovers, tourists, workers
Wild gatherers: multinational firms, iwi enterprises, commercial fishers (large integrated processors, SME suppliers), customary/community/recreational users, charter fishers, social enterprises
Aquaculturists: iwi, multinational commercial entities, small farm suppliers, large suppliers
Tourism operators: charter fishers, mammal watchers, restaurants, integrated operations, DoC, educational tourism operators
Seafood processors: multinational, SMEs
Blue tech enterprises: high-tech manufactures, seafood companies, health food operators, research institutes, discovery entities
Mineral extraction and processing enterprises
'Blue' professional service businesses: finance, legal, shipping & customs, consultants, research organisations
Research and education providers: science / social science providers
Bioactive prospectors: research organisations, venture capitalists
Central government agencies (MPI, MBIE, MfE, DoC, Stats NZ, Tourism New Zealand, New Zealand Treasury)
Local and Regional Governments and related agencies (economic development agencies, environmental monitoring units, coastal policy units, planning departments)
Industry organisations
Pan industry business networks and organisations such as Sustainable Business Network, Aotearoa Circle, and Pure Advantage (all of which have green investment / blue economy initiatives)
Regulatory bodies: private certification agencies, international import regulators
Māori industry organisations (Iwi Collective Partnership (ICP); Te Ohu Kai Moana (TOKM)
Investors: private, investment fund, pension fund, hedge fund, banks, joint-venture, cooperative, iwi, angel, green impact

Policy across the multiple agencies solidifies and shifts, and the agencies are often pitted against each other. As an export-led economic agency, MPI has a growth agenda. DoC and MfE have environmental stewardship responsibilities, while local and regional governments have environmental and livelihood responsibilities. Agencies in turn implement policy in complicated actual settings involving multiple relations across multi-scalar and functional jurisdictions, shifting political agendas, external shocks and trajectories (e.g. climate change, Covid pandemic), and complex relations among other economic actors.

State agency emerges from configurations of economic actors, rules and calculations. The QMS, for example, is in itself a pivotal part of the fisheries economy, but is a composite of agency responsibilities; fisheries management models; data collection practices; quota markets, fish behaviour; scientific contest; and political compromises between government agencies, iwi (and Māori more generally), quota owners, and commercial and recreational fishers.

Lobby groups of various forms, opinion makers, certifiers, and so on have an impact on investment, production and distribution questions. Industry bodies are key players in organising opportunities, collective action such as research spending, certification and provenancing, or and lobbying regulatory agencies. Alongside iwi bodies, they play a significant role in shaping relations between all the actors in Table 5.

Industry associations have an agency tied to the interests of their diverse members, from the largest firms who pay the highest membership fees to their smallest members. And they must respond to complex relationships and shared and competing interests among all the actors in Table 4. They are at the same time also creatures of the particular individuals on their executives and Boards.

Conservation & local environmental groups include small local restoration and advocacy groups through to national organisations such as Royal Forest and Bird and international groups such as Greenpeace. These organisations impact on eaters, voters, small business operators, government agencies, investors, and the views of individual executives, and through them on all the other actors. Greenpeace has raised public awareness of the impact of fishing and mineral extraction on the environment.

All of this exercise of agency is relational, within business, public and government, and among them. Underlying it are relations among people. An economy is always made up of people, whose interests, actions and values matter greatly in the way any economy is organised. People are investors, workers, eaters, consumers, submitters, voters, sailors, sea lovers, tourists, environmental advocates and so on. And they are never only one of these agents at any time.

These reflections are not particularly novel. However, as we were asked in a 2020 webinar outlining our findings, how are they helpful in terms of the instrumental challenge of creating value or managing economy?

The sections to follow will answer this question, but should there be a lingering doubt, we point to where we are writing this report.

In Aotearoa New Zealand, attention is being increasingly directed to Māori economy and the principles and practices that underlie it. Here, people, environments and economy are understood as pivotal and relational. This should not be understood as exceptional or put to one side while others get on with the export-led growth agenda that society has come to see narrowly as the 'real meaning' of economy. It is what the authors of this Report believe to be 'economy', and more significantly Māori are increasingly forcing this rethinking of economy.

Put more simply, there is much to learn from conceptions of Māori economy in this regard. A Māori economy positions people (collectively and individually, and past, present and future) and environmental entities at the core of its interests, management and governance (see Section 8.4.5).

All the varied agencies in an economy are understood as important and their agency is understood in relational terms. Whānau, hapū and iwi are bound in relational terms (most notably, but not exclusively whakapapa), and also in relation to environmental entities and other communities in their rohe (past, future and present). Those making investment and regulatory decisions are in turn bound to multiple knowledge bases, such that business knowledge is not divorced from social/environmental knowledge and mātauranga Māori.

The important point is that one of the challenges of blue economy thinking is to restore people, different types of organisation, non-human entities and social institutions to understandings of the practice of economy and debates about resource utilisation. Such a shift in understanding is crucial to disrupt business as usual and secure just transitions to a blue economy.

This should not be understood as Māori economy exceptionalism, nor as a question of wining hearts and minds in relation to pre-established economic logics and imperatives. Rather it should be seen as shifting established logics, imperatives, and organisational frameworks.

Our starting point in CVBE was to recognise exactly who and what makes up the marine economy in practice-based and relational terms – and to work forward from there.

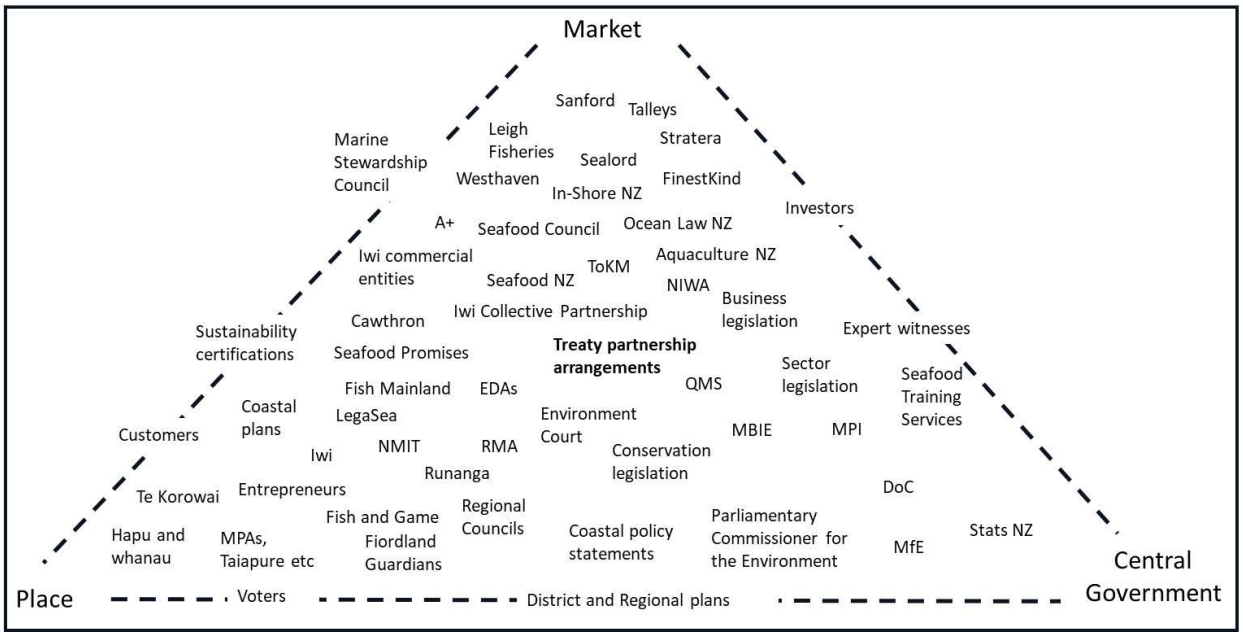
8.3. Recognising economy as social practice

The marine economy comprises a complex set of actors and relations with a variety of scales and sectors operating within a disorderly tangle of legal, economic and social frameworks and institutions. This complex was on show at the workshops we attended and organised as part of our research. The workshops demonstrated that economic actors extend to a multiplicity of stakeholders and that economic agency extends well beyond narrow transactions.

By understanding economy broadly as process and practice, we recognise that it is this complex tangle that requires management – not simply producer and investor, or environmental impact. In marine spaces, environmental management is economy and economy is environmental management. The lesson is very much a corollary of EBM.

Figure 15 maps the existing marine economy in an unfamiliar way: as a complex constellation of organisations and frameworks for action. It arranges this complex into the work of actors, organisations, institutions and relationships that are bound most tightly to social reproduction of economy in three interconnected spheres: place (people and environments), market relations, or nation-state regulation (local and national).

Figure 15: Re-imagining the marine economy as a set of relations



The diagram is indicative rather than exhaustive and presents only a sample of the entities involved in making NZ's marine economies. Much of the agency captured in the diagram is Māori (Runanga, iwi, hapū and whānau, and Iwi Trust Boards). Other agents include place based (Te Korowai) or national (Fish and Game; Forest and Bird) community organisations with environmental interests; education and research organisations (NIWA); and agencies that are both local and national and public and private at the same, such as regional development agencies (EDAs).

The focus is on understanding economy as practice and relations that together utilise resources for social benefit. This means, for example, that expert witnesses under RMA consenting processes become important actors in a marine economy rather than relegated to background architecture. So too do processes such as licensing or certification and authorities such as runanga and environmental stewards. All these actors are economic actors.

Figure 15, then, describes *an actual economy made of agency that is anchored in some combination of one or other of co-constitutive domains of social reproduction*. It recognises, for example, that even the most narrowly transactional entity or regulatory instrument is connected to the world, and that markets are made by regulation and people in place.

It makes three specific major points:

- economy is a political and socialised sphere where economic actors create values in relation with a myriad of mediating institutions and regulatory practices
- the marine economy is a contested and dynamic assemblage of embodied economic and social action – actual people in actual agencies doing actual things
- economic possibilities are shaped by public, private and social agencies in relation to each other, established institutions, and shifting environmental, political and market realities

This radically different mapping of 'economy' aligns neatly with the holism of ecosystem-based management. It provides a framework for exploring what a blue economy night look like and how to transition towards to achieve new pathways of economic development.

Figure 15 highlights the extent, place-boundedness, and multiplicity of interactions and agency at work in decision making around environment-economy relations. The relationships I identifies all represent a complex of decision points and possibilities for, and barriers to, transitioning. The real relational landscape of practice highlights the need to think about a far richer field of opportunities and responsibilities than is normally recognised.

8.4. Beyond sectors – novel categories of blue economy

Figure 15 also reminds us that traditional economic measures and categories of economic actor make visible and prioritise only a specific subset of economic activities and agency. Earlier sections of the report reveal that one consequence is that this obscures the efforts of experimenters and their initiatives to make change. We also argue that it restricts the abilities of policymakers, managers and communities to identify opportunities and sites for intervention, and thus to imagine and enact a blue economy.

Transitioning implies disrupting business as usual and thus thinking beyond sectors and values. In this section, we use a heuristic model of marine economy to identify more helpful categories as objects of management. Our aim is to highlight the need to work with more comprehensive and flexible frameworks that identify who is involved, what they do, and how they are related to each other, the environment, and the wider economy. New categories of economy are necessary to create this visibility, identify a wider interconnected cast of interested parties, and pose (and answer) strategic questions.

We start by observing that economic activities in marine spaces comprise a diverse mix of economic enterprises with different orientations and organisational forms as well as *non-market* economic activities, actors, and non-human entities. This tells us that Aotearoa New Zealand needs *different forms of economic management for different forms of activities* in relation to stimulating a blue economy. Not every dollar calculated in GDP measures is worth the same amount.

Table 6 reclassifies marine economy activities into different and overlapping forms of activity. We distinguish different activity in relatively conventional terms by size, scale, investment structure and market orientation, but also by ethical orientation, nature of practice, and transitioning possibilities. This step allows the explicit introduction of agency, actual practice, real connections, and the potentialities of latent and unexplored connections.

Table 6: Categorising the economy as management

	Size of Enterprise	**Scale of orientation**	**Investment structure**	**Market focus**	**Practice**	**Ethics**	**Transitioning opportunities**
Commodity	Large - medium	Global	Corporate	Export	Extractive / scale processing	Accumulation	Certification; CSR
Foundational	SMEs	National	Varied	Varied	Supply and service	Support	Social mandate / regulation
Blue tech	High capital, low employee	National – global	Angel	Enabling / exporting	Innovation	Promissoriness	Green-technologies
Distinctiveness	Small - medium	Place – global	Entrepreneur	Value-add, export	Creativity / artisanality	Distinction (place, quality)	Provenance
Community	Small	Community	Family, co-op	Non-market	Cultural / use values	Community, environmental	Collectivity
Māori	Corporation to marae	Whānau / hapū / iwi	Whānau / hapū / iwi	Varied	Diverse	Te Ao Māori	Indigenising blue economy

The categories focus attention on distinctive grounded economic configurations and the practices that define them. They offer economy-environment actors (council officers, economists, investors, consultants, publics, communities) new conceptual tools think strategically about and steer Aotearoa's marine environment. With the right measures these actors might begin to develop robust management tools to address competing demands on environmental resources in a more robust and holistic way.

Table 6 identifies six possible categories of economy: community, Māori, commodity, foundational, and two types of value-added economy (technology driven and distinctiveness economies). The categories direct attention to the nature of activities, relationships and organisational rationalities, rather than sector. They are characterised by different types of enterprise, business models, economic relations and investment structures, market orientation, and organising principles (Gibson-Graham, 2006).

These categories of economy obviously overlap in many ways, for example Māori economic actors are involved in all the different categories identified. However, the different categories have distinctive structural forms, practices, and ethical coordinates (forged in relation to differing economic rationalities and imperatives).

In brief, the Table helps us to demonstrate that not all economic activity is commercial and not all business enterprise is the same or organised and evaluated in the same way. Every dollar of output does not have the same value and its production does not have the same impacts or consequences. This raises the question of why Aotearoa New Zealand should manage economy-environment relations as if they do and as if zero-dollar outputs have no value or no dollar values that are not immediately apparent.

The reality is that decision makers across the full landscape of Figure 15 make accommodations, but these are hidden by the façades of sectoral analysis, shared industry-community-state interests, and the assumed economy-environment antagonism. This is what the categories of economic activity revealed in Table 6 begin to disturb

In the following sections we elaborate on these categories.

8.4.1. Commodity economy

The sector-level figures captured in national income accounts and export measures are dominated by large-scale production and processing for international markets. They are often dominated by the operations of a small number of large operators. This type of economy involves high volume, low-value-added products, fast moving consumer goods business models, and the economic activities that support them. This is what we term a commodity economy, which in the Aotearoa New Zealand context, is tied inexorably to production for export and strategies of scaling up to serve it.

New Zealand's marine economy is dominated by commodities. Oil, gas and minerals are commodities; unprocessed or minimally processed seafood, the experiences of tourists bused from place to place in large groups are commodities; and extracts from marine organisms sold in bulk are commodities.

A commodity economy is dominated by drives to increase production, scale-up activities, and increase exports, and by approaches to resource management that will facilitate this model. This in turn drives consolidation and further scaling-up, which in turn requires large injections of capital and the business models that derive from them. While participants refer routinely to the prospects of adding value, the logics of these large-scale business models tend to dictate a preoccupation with scale.

This economy is the default understanding of Aotearoa New Zealand's marine economy among most research participants. This drives many of the positions taken towards economy-environment relations.

This understanding reflects what Campbell (2020) terms a powerful political ontology of productivism, which locks-in commodity economy understandings of economic purpose and opportunity around business models, investment strategies, the making of policy and the organisation of corporate practice premised on increased production and/or cost reduction. This mentality is particularly apparent in the way that opening up new space for aquaculture is understood and presented to the public and regulators.

Historically commodity economies have been associated with poor environmental practice, the extraction of benefits from communities, and disruption and reconfiguration of livelihoods. Established regulation of the commons has been unable to cope with the rise of large-scale commodities, especially in the oceans.

In Aotearoa New Zealand in recent years commodity economies have become increasingly associated with the hiring of low wage immigrant labour to carry out repetitive tasks for long hours. Aotearoa New Zealand's land-based economies have become characterised by fast-moving ingredients or consumer goods business models, with enterprises scaling up to exploit economies of scale and compete in global marketplaces through volume (Pawson et al. 2018).

Pawson and colleagues recognise a significant trap here at the national scale (Pawson et al. 2018). They observe that resources fall into the hands of global capital, global labour begins to be imported to harvest and produce goods at low-cost, and pressures to increase volume and yields are ever-increasing.

The argument is not a rejection of foreign capital or scaled-up production per se, but that the business model becomes the default at the expense of continuous negotiation of the terms of exchange with the rest of the world and assessment of the distribution of costs and benefits domestically. These crucial parameters of decision making to do with national futures are excluded from consideration in contemporary conceptions of economy and approaches to the management of environment-economy-society relations.

The consequences to date in land-based production are that Aotearoa New Zealand environments bear the costs, while the benefits largely flow off-shore – albeit commonly cycled through domestic elites. Headlines figures about marine economy are dominated by large producers operating on scale economies and FMCG business models.

There is no way to strip out commodity production from other forms of economic activity in existing measures. While size of firm is often used as a proxy, large firms can be involved in value-added production and small firms locked into commodity economies. Māori business

entities are involved in multiple forms of economy, from commodity economy to customary economy.

The boundaries are porous and are often product or sub-sector specific – individual enterprises can be involved in different economies (commodity, Māori, foundational, value-added and technoscience). Two things are especially important in contemporary marine economies: overlaps with Māori economies, value-added economies, and techno-scientific economies; and the rise of corporate social and environmental responsibility within commodity supply chains.

These borderlands between commodity and other economies are important. Commodity production will remain a part of New Zealand primary economies for the foreseeable future, especially as frontiers are explored and more resources made directly economic in the oceans. There are significant opportunities for national businesses to grow, and in an ideal world to develop high value products as they scale-up. Te Ao Māori approaches, new green technologies and a value-added policy agenda will work to keep FMCG models and economies of scale in check, and help to prioritise products, business models, and technologies that pursue blue economy futures.

Significantly, commodity economies are facing a challenge from cellular agriculture and aquaculture, and vegetarian-based diets. Aotearoa New Zealand requires an agenda that finds room among these pressures to pursue value-added agendas that realise the values of growth if managed well and directed at distributing benefits widely.

As Aotearoa New Zealand anticipates rounds of heavy investment in blue technology, new fishing technologies and off-shore aquaculture, two limits of commodity economies must be addressed.

- First, commodities and high-volume low-value processing return less to place per unit of resource than value-added products – by definition.
- Second, if the future of protein markets split into very high-value animal proteins and low-value non-animal-based protein, then investment in growing commodities today might be better directed to smaller volume, longer term value generating prospects that better utilise marine resources.

Being able to distinguish activities as commodity-driven, governed by Māori economy principles, and/or value-added would be a first step towards organising a response.

8.4.2. Foundational economies

A group of heterodox British economists use the notion of the ‘foundational economy’ to direct attention to the dominant role played in terms of jobs and the reproduction of society by economic activities that supply domestic populations with essential goods and services (see

Bentham *et al.,* 2013). These include food and resources for domestic consumption, health and education, infrastructure and utilities, cultural activities, and mundane services such as plumbing, motor vehicle repairs, state administration and so on. The enterprises involved may take any size but are commonly SMEs.

The foundational economy school argues that economic policy should prioritise fields of economy where most jobs lie, most values are created, and most people benefit. They argue that too much policy attention is directed to high-tech solutions and exporting. Exporting has its place but should be treated as supporting local economy.

Our point here is less to echo this argument in full and more to observe that over the last forty years governments in Aotearoa New Zealand have tended to prioritise marine exports over heterogeneous locally-focused enterprises that produce products for everyday needs and depend upon and build relationships with local places.

The boundaries between foundational and commodity economies are blurry, but if our goal is transitioning to a blue economy, then focusing attention on foundation economy activities is important – in terms of cultivating alternative uses of resources as well as encouraging sustainable production.

The answers to all economic questions do not all lie in high-tech enabled exporting. They may also lie in high quality fresh seafood products at good prices for local consumption, mineral resources for building infrastructure, local jobs for local people, or readily available high-quality, low-tech domestic tourism experiences.

Given Aotearoa New Zealand's structural dependence on exporting, a policy shift towards cultivating these economies as a platform for a blue economy might in practice complement new export-led blue economy strategies. A focus on foundational economies is an important strategy for driving a blue economy approach and will need to be recognised and encouraged alongside amenity, cultural engagement, customary take, and recreation economies.

8.4.3. Value added economies: Distinctiveness and technology

As with other primary sector economies, the holy grail of economic development in New Zealand has long been identified as value-added products (Coriolis 2017). We take this proposition further to argue that value-added business models and products can be achieved by prioritising distinctive products, businesses, and processes as well as cutting edge technologies.

Value adding has tended to fall into three broad strategies: the promotion of technology, design, or provenance values. In the realm of the ocean economy in Aotearoa New Zealand, this

has in practice tended to reduce to the application of new technology (blue technology) or the attachment of provenance narratives.

Multiple marine economy activities in Aotearoa New Zealand and the firms that promote them draw on distinctiveness to create value. Firms of all sizes are engaged in seeking to create distinctiveness values, but for many smaller-scale enterprises they are pivotal in securing a niche in markets.

Sources of distinctiveness value in New Zealand's marine economies include environmental uniqueness (e.g. the green-lipped mussel), New Zealand's tourism and seafood reputations, New Zealand's cultural and environmental reputations, company-level seafood brands, certification standards and associated promotion, artisanal practices, and indigenous provenance narratives.

These activities inevitably promote and create distinctiveness values from narratives of provenance and associated credence claims. These are carried in various texts from social media to corporate promotions with high-end production values such as Seafood New Zealand's 'Promises' campaign. The narratives are steeped in principles of the blue economy.

Blue technology economies generate value from the development and/or application of new technology. Blue biotechnology is emerging as both an enabler of marine activities and a configuration of activities. The category enables us to capture a diversity of actors from venture capitalists to universities, and technology entrepreneurs.

They are often associated with higher levels of capital input for science and commercialisation, different sources of investment, and attachment to knowledge economy discourses. They include public and private enterprises that produce knowledge and specifically blue technological goods.

Blue technology may be applied to existing sectors or to release new uses for marine resources through, for example, bioprospecting or tidal energy. Blue-technology goods can be developed to enable other enterprises to add value by processing raw materials such as in mussel oils or other nutraceuticals or provide for new production solutions such as in off-shore aquaculture or new fishing gear. They may be products themselves such as in bioprospecting or the export of technological solutions for production and processing.

The boundaries are again blurred between commodity economies and both tech-driven and provenance driven economies. On the one hand, provenance and high-tech value adding represent distinctive types of activity that can support enterprises of different sizes to develop niche markets. They. On the other hand, technology and provenance are used to add small quanta of value in larger scale enterprises or production runs. They might be utilised to allow otherwise large commodity producers to target higher priced markets through quality advances

(new products, packaging, quality controls) and/or credible provenance branding and certification (indigenous, 'green' and place-based credentials).

These practices are often marked by the struggle to claim and demonstrate authenticity. This struggle represents an important site of potential for proliferating blue economy principles.

The critical point is that policy makers and/or investors and consumers may wish to measure and target the production of value through distinctiveness or new blue technology. Having at least the conceptual tools to distinguish among activities within and across firms and sectors is potentially helpful for encouraging value creation in a blue economy.

8.4.4. Community economies

Our interest in community economies echoes that increasing expressed by international commentators (Community Economies Group, 2020 https://www.communityeconomies.org/about/community-economies-research-and-practice) and Māori academics alike (Rout et al. 2019; Amoamo et al. 2018; RIngham et al. 2016; Bargh 2014).

International networks such as the Community Economies direct attention to activities carried out beyond or at the margins of capitalist organisation of labour, exchange and distribution. They draw on empirical observations that goods, services and services are produced across a vast range of social practice from the household to social relationships, collective organisation, and informal economy. They challenge three problematic aspects of how "the economy" is understood: inevitably globalising and capitalist, a determining force rather than a site for contest and transformation, and radically separated from ecology.

The argument is that there is a class of economic activity conducted at community scales that is made up of activities organised around an ethos of care for the environment and community (Sharp 2020; Foley and Mather 2016; Witter and Stohl 2017; Said and MacMillan 2020; Schreiber et al. 2020; Gibson-Graham et al. 2013, 2016). They identify activities based on ethics of surviving well, environmentally just production, just transactions, consuming sustainably, distributing surplus to enrich community and environment, replenishing the commons, and intergenerational investment.

In the Aotearoa New Zealand marine space, community economy activities include gathering seafood, fishing for family sustenance and gifting to others, gathering seaweed to fertilise gardens, activities such as those organised by Free Fish Heads, customary gathering for cultural purposes, ecotourism activities run for the purposes of education and collective good, and the possibility of local markets for seafood.

By highlighting the existence of community economies, we aim to make visible and credible as economic the utilisation of marine resources for personal and community consumption, recreation and recreational fishing, local (potentially non-market) exchange of fish and seafood, and the part played by coasts and oceans in cultural, spiritual and social reproduction. Failing to treat these uses as economic contributes to discounting their values relative to export revenues or national output calculations.

Much community economy in Aotearoa New Zealand is Māori, such that this category of activity overlaps significantly with Māori economy.

8.4.5. Māori Economy

Māori are significant market and non-market participants in marine economy (wild fisheries, aquaculture, marine tourism, and non-market customary harvest), as well as cultural and spiritual users (Rout et al. 2019: 95). Māori enterprises operate across a range of forms and scales, from pan-iwi interests (eg Moana Fisheries) to iwi-based businesses, down to whānau-sized operations such as small tourism enterprises. Māori investors and entrepreneurs (at iwi, hapū and whānau levels) lead initiatives in fisheries, aquaculture, ecotourism and blue biotechnology.

As a distinctive existing category of economy, Māori economy encompasses economic activities conducted by Māori commercial enterprises or social entities across all other categories of economic activity (including customary activities). Māori economy is distinguished by its management in relation to principles of Te Ao Māori. It is a fundamental dimension of what might be a blue economy in Aotearoa New Zealand and already leading BE initiatives, from corporates to customary users.

Through a series of allocations under the Treaty of Waitangi Fisheries Settlement Act and subsequent purchase of quota, Māori now own approaching 30% of quota in the New Zealand quota management system (https://teohu.maori.nz/wp-content/uploads/2018/06/Building_on_the_Settlement_TOKM.pdf). Māori are now major players in aquaculture as well as fisheries and are entitled to take up an additional 20% of all new consented aquaculture space. They have an estimated 35% share in the seafood industry by value (Envirostrat Ltd, 2019, p. 7).

This centrality is formally recognised across all marine economy sectors, especially in fisheries and aquaculture. The NZ Aquaculture Strategy is the latest example of a development strategy that centres Māori-led national development.

Māori are also extending their prominence into blue technology through, for example, Wakatū and Hikurangi enterprises, as well as taking leadership in green investment and national sustainable finance initiatives.

Beyond marketised economy, many Aotearoa New Zealand coastal communities are predominantly Māori such that community economy *is* Māori economy. Māori also have customary use rights that are enshrined in law.

While subject to commercial interests and imperatives and legal frameworks, Māori commercial businesses operate in relation to a set of deeply embedded relations, management and governance frameworks, and operating principles rooted in Māori kaupapa and tikanga (Rout, et al., 2019, pp. 17-18). These also guide and govern Māori community economy, and include:

- *Kaitiakitanga* - commonly translated as guardianship, for Māori it is a positive obligation to apply local knowledge to environmental decision-making
- *Whanaungatanga* - relationships with and caring for one's family, extended family and community
- *Manaakitanga* - relationship building through welcoming and extending hospitality to neighbours and visitors
- *takahe-utu-ea* - the principle of compensation that restores balance where there have been breaches of tikanga (e.g. between competing commercial and tikanga imperatives)
- *tapu* and *noa* – an approach to resource management that endeavours to achieve a balance between people and the environment, the human and divine, and use and restriction on use

Kaitiakitanga is particularly important. It links the pragmatic need for economic development with cultural and spiritual concerns and place-based environmental stewardship. This includes exercising use rights, building market enterprises and relationships, securing collective community (whānau, hapū, iwi) welfare, and safeguarding ecosystem health. This positions Māori economy as blue economy in the marine estate.

Māori economy extends well beyond the confines of Māori owned businesses and customary practices. Māori have extensive rights and interests in the marine estate beyond activities that they control directly. As Treaty partners and as kaitiaki or stewards of the natural environment for generations to come, Māori have rights to exercise rangatiratanga over the marine estate (Rout, et al., 2019).

it is important not to conflate existing Māori business operations with the full potential of Māori economy. Māori do not necessarily operate in a traditional framework, which creates tensions between traditional forms of organisation and corporate-beneficiary approaches (Reid, Rout, & Mika, 2019, p. 42). Existing Māori marine economy is shaped by the structure of the Treaty settlement process as it was materialised through legislation (Reid et al. 2019; McCormack 2016). Under the QMS, for example, quota is held within non-traditional corporate structures, the economics of fishing has been reframed at non-traditional scales, and rules have

been set around quota trading, marine protected areas, and customary/recreational take that have created tensions in traditional economy.

Māori business ownership structures and business models define a distinctive form of enterprise, but there are no clear boundaries between Māori economy and other activities in a blue economy. As economic actors with distinctive business models, kaitiaki, and Treaty partners, Māori have extended their influence into other parts of the marine economy. They are in many fields leading transitions towards an indigenised 'blue economy'. Māori economy

- offers a fulcrum for balancing environmentally sound practices with social, cultural and environmental goals, well-being, and business success
- assets for securing premium markets for marine economy products through provenance values and credible claims of ethical and environmentally sound production practices (Envirostrat Ltd, 2019, p. 7).
- presents opportunities to incorporate green finance, regenerative and restoration economies within a localised mātauranga Māori framework (Hikuroa, 2016)

We develop these observations below to argue that indigenising marine economy offers a foundation for blue economy transitions, albeit with a defining set of challenges.

8.5. A heuristic model of blue economy

Table 6 uses a research-based classification of economic activities to reimagine Aotearoa New Zealand's economies in ways that will help actors enact new visions and reinvent economy. Unlike conventional indicators of economy, it derives its understandings from a study of economic agency; that is, it begins by asking what different actors do and how economies are organised.

By disaggregating economy into a small number of *'coherent' and 'defining' organising relations*, Table 6 focuses attention on the practices that comprise them. It allows us to imagine a distinction between a marine economy and a blue economy based on *the nature and organisation of activities and economic practices – distinguished by those that contribute positively to economic, environmental, and community well-being.*

The proposition is that the categories are more meaningful for understanding resource use, investment dynamics and connections within and between different sub-sectors of marine 'economies', identifying collective interests and shared practice, and making management and policy decisions. The model emphasises that:

- the firm is neither a closed nor stable entity; rather, it exists in co-dependent and networked forms, and may be split across and encompass different types of economy

- different economies are far from discrete – any one enterprise may be operating in multiple economies
- connections among relations, practices and marine economy organisations cross boundaries between 'sectors' and involve prior structuring logics that imply different policy interests and invite improved management through different lines of attention

The model is heuristic. It aims to elucidate difference, possibility and policy problematics, rather than create measurable artefacts that define stable objects for fixed forms of distanced management. It also offers new ways of categorising economy that might be used to develop new systems of measurement, and a new approach to valuing economic activity that embraces the idea that not all dollars of income and growth have the same value. Policy makers might devise new measures to differentiate between these categories and identify new priorities for, and forms of, intervention and management such as certifying products, consenting new developments, funding scientific research, or distributing economic rents.

Figure 16 uses the categories derived in Table 6 to highlight the presence of blue economy activities identified through the CVBE research. Its aim is less to define a prototype for a blue economy derived from these categories, and more to reveal how actors from investors to regulators are themselves plotting transitions.

The figure represents a field of experimentation with different value propositions which translate into supportive practices. This level of disaggregation and scrutiny is largely absent in business as usual economic analysis in the Aotearoa NZ context.

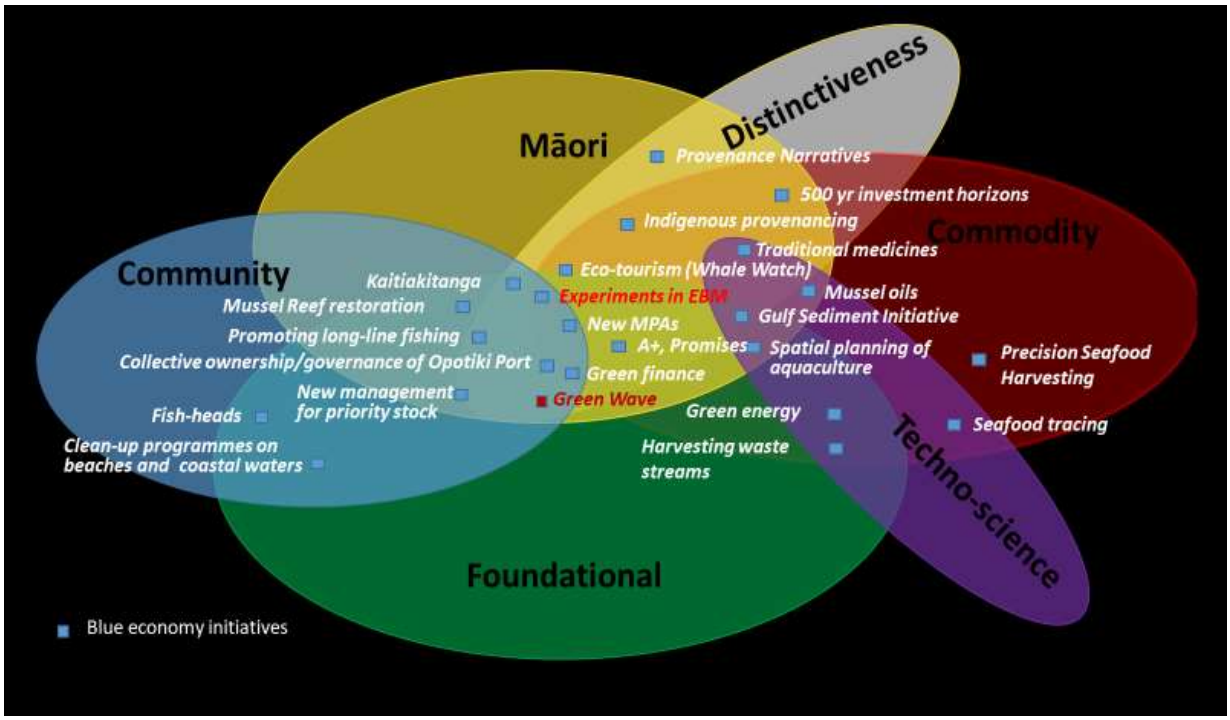
The initiatives, including emerging experiments with EBM in Marlborough and Hawkes Bay and the Greenwave experiment (Section 10.3.1), are a sample of those that we encountered. They serve to demonstrate how actors are in different ways committing to a blue economy. We do not make the claim that the enterprises or agencies launching these initiatives are *blue economy enterprises*; or that they have fully coherent blue economy strategies or leave behind their location in different domains of economy more broadly. Rather, the activities might be understood as blue economy initiatives, which taken together point towards an emerging national blue economy. The challenge of enhancing a blue economy, is to convert independent into interdependent investment trajectories.

Put another way, the diagram suggests a diversity of principles and practices that might be prioritised in relation to specific initiatives as they are assembled into objects for management in a blue economy. For example, the activities identified might be prioritised for investment or research into blue economy futures. We might *identify practices and initiatives*, such as those in Figure 16 *and seek to proliferate them, join them up, extend them into new spheres,* or *use them as examples to stimulate further experimentation with blue economy*.

Significantly, these activities or practices extend across the full range of economic practices from governance, management, and values generation to production technologies, investment

finance, and certification of products. Building economy in this way is different to measuring, lobbying and planning around abstract sector measures and abstract conceptions of growth as success.

Figure 16: An emerging blue economy in Aotearoa New Zealand



This account of economy allows for judgements to be made about exactly what is being done and might be done better. It allows for a fuller participation for managers and publics in creating value(s) in our seas, setting priorities in relation to costs, and scrutinising beneficiaries.

The CVBE research is practice driven. Practices allow comparisons; they demonstrate the presence of shifts in behaviour and commitments. The altered practices recorded in Figure 16 examples of experimental investment among different categories of enterprise. They will proliferate and shift investment trajectories in different ways and at different scales, and they will have different effects.

The CVBE research also focuses attention of experimentation in transitioning, rather than codifying and bounding meanings of blue economy (Lewis et al. 2020). Figure 16 is designed to capture this approach. Examples of experiments in initiative-driven economic development abound at different scales (geographical, sectoral). The Provincial Growth Fund revealed extensive community aspiration and imagination in blue economy thinking, including for example interest in harvesting mussel spat in Northland, launching a Paua Hatchery in Kaikoura, and rejuvenating Port Tarakohe in an integrated, cross-sectoral blue economy initiative.

Without posing wider questions about the context and formation of marine economy sectors, policy agencies and industry risk developing environmental and social strategies based on incomplete understandings of economy. Conventional data and statistical analysis provide little guidance on moving towards interdependent blue economy investment trajectories. Thinking the constraints of data framed by standard industrial codes (ie beyond sectors) means recomposing standard understandings of economy, focusing on practices, breaking through lobbies, and understanding blue economy as aspiration rather than a pre-defined object of management.

Blue economy thought and practice is context specific, as per the categories of practice identified in Table 6 and Figure 16. It opens the possibility of encouraging blue economy as a process of experimentation and proliferating different practices in different settings.

9. Managing Economy-Environment Relations for a Blue Economy

The full suite of Sustainable Seas research strongly indicates that change in the way we utilise and manage marine environments is necessary. Essentially what is meant is changing the way we organise and perform marine economy. This poses a serious challenge to the orthodoxy in practice, analysis and management of economy-environment relations. It also presupposes a serious challenge to how we understand and manage the costs and benefits of economic change.

We argued in earlier sections that:

- economic activity and environmental management are bound together as one in resource economies
- sector-based national income accounting has created a particular object (marine economy or individual sectors within it) for a certain form of management (the pursuit of export-led, commodity-based economic growth)

Not surprisingly, Aotearoa New Zealand's existing knowledge base limits the potential for a blue economy in Aotearoa New Zealand. We have proposed a disruptive understanding of marine economy (Figure 15) and an alternative typology (Table 6 and Figure 16) for mapping contemporary marine economy.

Existing measures of activity, relations identified for management, and frameworks for prioritising interventions do not currently exist to operationalise this interpretation of economy.

In this section, we highlight the tensions between economy and environmental management inscribed within our current resource management regime that restrict opportunities to create value from a blue economy. We draw on research within CVBE and other projects in the Challenge to suggest that *in its application at least, our current regime is not fit for the purpose of creating value in a blue economy*.

Rather than proposing new measures to prop up an outmoded management regime, we ask what kind of management regime might work best to generate a blue economy understood in the terms laid out in Figures 15 and 16. We suggest an opportunities-based environmental management regime centred on practice-oriented, place-based possibilities and priorities. To do so we build on a set of provocations drawn from a review of Sustainable Seas research:

- Environmental management regimes are social arrangements that select and legitimate a certain form of economy, but this is poorly understood by most economic actors
- Aotearoa New Zealand's existing environmental management regime is a dense network of mutually supporting agents and institutions that sediment and elaborate RMA processes, which in their current form are not fit for a blue economy purpose

- Environmental management under the RMA regime is viewed and practised as setting rules to constrain economy through a power-laden assessment of effects, rather than exercising judgment to support new, values-creating investment possibilities (injecting a defining but unhelpful antagonism at the heart of resource economy)
- Change needs to be driven by *blue economy actors* (including iwi/hapū/whānau, government agencies, community groups, activist organisations and philanthropists, and research organisations) who are imagining and doing economy differently (to ensure change is socially valuable and to meet community/environmental goals)
- Blue economy requires a more constructive and value-focused management ethic than growth within limits
- Genuine community-level participation and collaboration are more effective than adversarialism in reconciling conflicts productively at the economy-environment interface

9.1. Environmental management in practice: Frustrating value creation

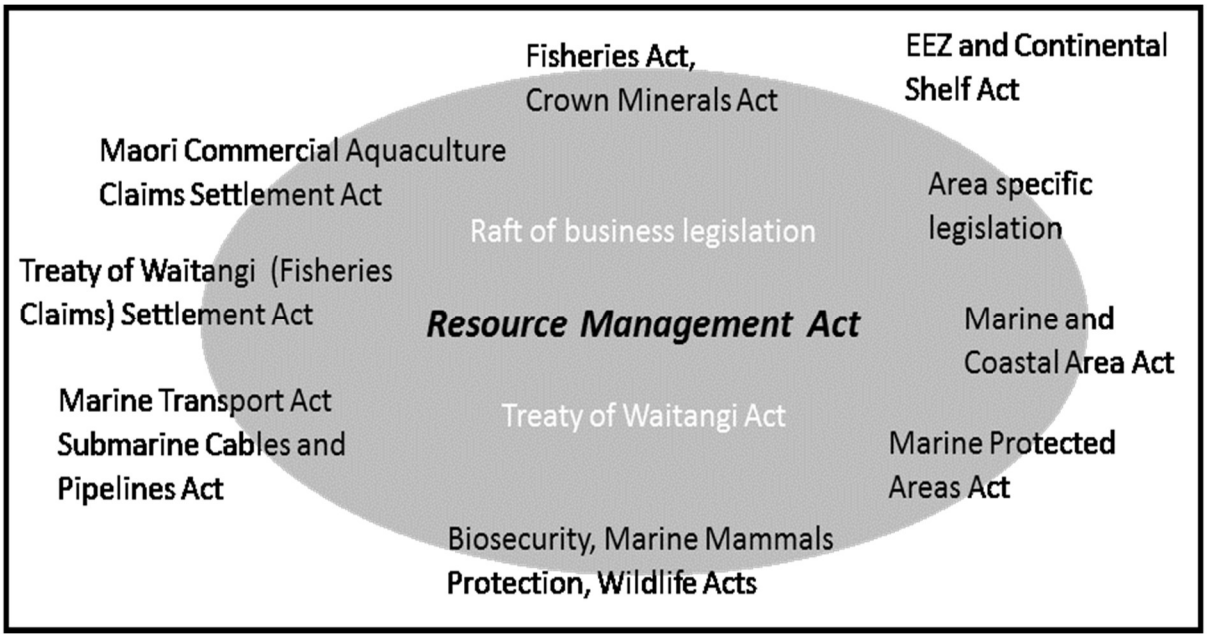
The concept of a Blue Economy, with its explicit focus on ecological wellbeing, carries with it a strong critique of current ecological practices and their subservience to economic development. Transitioning to a blue economy requires reconfiguring economy-environment relations. It must ask how Aotearoa New Zealand might create an environmental management infrastructure that moves beyond mitigating and remedying the adverse environmental effects of human activity.

New Zealand has a vast and resource-rich marine estate, which is overseen by a distinctive legislative and management regime Figure 17. Figure 17 summaries the legislative framework around environmental management of the marine economy.

For most marine economy activities, the Resource Management Act 1991 (RMA) and the work of the territorial local authorities (TLAs) that administer it sit at the centre. The RMA is the pivotal legislation pertaining to estuaries, coasts and inshore resource management. It governs the management of routine marine economy and the potentiality of a blue economy through its planning architecture and consenting and appeals processes.

The jurisdiction of the RMA and TLAs is conditioned by the Treaty of Waitangi Act 1975 and cross-cut by a suite of place-specific legislation (on the right hand side of the figure), as well as wider economic legislation that confers rights and imposes obligations that transcend the RMA (Peart et al. 2019). Alongside the RMA, central government agencies have research, monitoring, policing, evaluation, policy setting and oversight responsibilities. The Department of Conservation, for example, is responsible for the Coastal Policy Statement while the Ministry for the Environment (MfE) oversees various other National Policy Statements that impact on marine economy-environment relations. Nationally significant development proposals are handled by the Environmental Protection Authority (EPA).

Figure 17: A legislative regime of marine management



In territorial terms, the RMA holds jurisdiction out to the 12-mile limit and regulates most of the day-to-day marine environment-economy relations, including tourism, aquaculture, coastal infrastructure and subdivision and other land-based activities that impact upon estuaries and coastal areas. The Fisheries Act (1996) governs fisheries from shore to the EEZ, while the Exclusive Economic Zone and Continental Shelf Act (EEZCS) governs mineral extraction beyond the 12-mile limit[11].

Economy-environment relations are largely managed by TLAs under the RMA. Effects-based and permissive rather than directive, the RMA enshrines the concept of sustainable development. The positioning of the concept of sustainability at the core of resource management in Aotearoa New Zealand has had a number of positive effects, most notably normalising the idea and forcing developers to attend to it.

The sustainable development focus within the RMA, however, has been increasingly reduced to a 'growth within limits ethos' in which 'green' environmental management and economy are positioned in an adversarial relationship (at least in its implementation) (Tadaki 2020; Šunde et al. 2018; Davies et al. 2018; Duncan 2017)

The sustainable development logics of the RMA position the interests of community and environment as a constraint on the economy. They have come to be seen as such by regulators, developers, other stakeholders, and many members of the public. Stakeholder engagement strategies continue to locate economic action firmly in the market realm and tend to equate it

[11] See also https://www.sustainableseaschallenge.co.nz/assets/dms/Other-docs/Marine-legislation-graphic/Sustainable-Seas-Marine-Legislation-Poster-Oct2020.PDF

to growth and scaling up: economic imperatives are predetermined, asocial and non-environmental and inexorable. Those speaking for social and environmental considerations are positioned as anti-economic and commonly as irrational.

These separations are matched by separations in the treatment of environments. Those participating in our workshops agree that the RMA regime has come to focus attention on discrete actions and discrete environmental effects, as well as discrete consenting processes. Elsewhere in the Sustainable Seas Challenge, researchers argue that the RMA has been unable to deal meaningfully with the cumulative effects of economic development (Davies et al. 2018).

The regime is argued to be fragmented, inconsistent and disjointed – scales of management are commonly inappropriate for EBM scales of impact (temporal and geographical) and the combined impact of effects is argued to be ignored (Davies et al (p. 6). Davies and colleagues suggest that this has resulted in degradation of marine environments, loss of resources and environmental and socio-cultural capabilities, and increased uncertainty for investors and industry.

The RMA has at times been mobilised to prevent the worst effects of damaging development and to initiate mitigation for less damaging impacts. In such cases, it has secured a view of environmental management as a necessary obstruction to intrinsically destructive resource use. Similarly, it has provided voice for Maori in times preceding the development of more meaningful co-governance and co-management provisions, which are still in the process of being developed (Peart et al. 2019)

However, it is more commonly presented as an obstruction that frustrates what is required to facilitate growth. Choices are largely overdetermined by 'the economy', which in the prevailing standard sense is cut adrift from publicly endorsed environmental management as its enabler and stabiliser AND from its relations to 'place' and its purpose to produce livelihoods.

In this sense, the RMA operationalises a deeply ingrained resource-frontier ethic of private property and political commitments to an export-led national economic growth agenda. While it can obstruct growth in the interests of the environment and thereby constrain damaging action from a range of interests, it privileges growth over the possibilities of negotiating different forms of economy.

The separation of environmental and economic interests around a driving logic of growth, ultimately manifests as trade-off processes in the daily administration of the Act and in the 'winner-loser' adversarialism of the Environment Court (Young 2007; Duncan 2017). This comes with a set of consequences:

- orthodox environmental regulation is positioned discursively as obstruction – by environmental advocates as well as established resource development agendas and interests

- strengthening industry-state alignments in national growth agendas tends to reinforce this separatist adversarialism at the expense of opportunities for communities to manage their environments and shape their own futures
- neither the economics and outcomes of development or environmental processes are critically scrutinised with respect to exploring best outcomes for place (community or environment) in an holistic sense
- decisions are reached through universal and predetermined evaluation procedures that rely on expertise and external rulesets to settle contests
- initiatives that treat regulation and economy as co-constitutive are rare and undermined by state agencies that demand knowledge that they can implement via business-as-usual structures
- the discourse of trade-offs is so normalised that it is accepted without thinking as common sense – setting priorities, coming to judgements, and making wise choices need not be understood as a technocratic process of trading-off
- environmental management misses opportunities to harvest the creative energy and opportunities for a different form of economy created by contesting ideas among the different interests including local communities and tangata whenua

While this reading is far from universally accepted and will be contested by many, our point is that the separations and adversarialism of resource frontier development thinking are locked into the RMA. The effects-based emphasis makes the Act developmentalist in a restricted, singular and business as usual way (Young 2007). This generates a series of consequences that mitigate against thinking and action that challenge business as usual. When it comes to creating value in a blue economy, this *orthodoxy stifles possibilities by representing difference as competing development versus anti-development rationalities and channelling them into dead-end trade-offs*.

9.2. Resources for rethinking resource management

Aotearoa New Zealand's government is increasingly cognizant of its obligations under the Treaty of Waitangi.[12] The Treaty brings legislative complexity to the formulation, legitimation and implementation of contemporary management and regulation of marine spaces (Peart et al. 2019), especially as a new generation seeks to negotiate the meaning of 'partnership' under its terms.

Still far from fully negotiated or formalised in practice or regulation, Treaty partnership gives Māori multiple participatory rights in environmental management and imposes multiple obligations on the authorities that administer it. These are registered formally in the RMA itself

[12] The Treaty of Waitangi established a partnership in sovereignty between the Crown (represented by government) and Māori, the nation's indigenous population. The three guiding principles of the Treaty are partnership, participation and protection. See https://waitangitribunal.govt.nz/treaty-of-waitangi/.

as well as the EEZCS and specific legislation that sets out Māori rights, including the Māori Commercial Aquaculture Claims Settlement Act (2004) (MCACSA) and the Treaty of Waitangi (Fisheries Claims) Act (TWFC).

It is settlements under the Treaty, their legal formulation, and the working out of the Treaty partnership that create the structural underpinnings of Māori marine economy. They also support examples of, and increasing calls for, environmental co-governance and co-management.

Significantly, these various partnership 'conventions' in relation to Māori economy are invoking new social collectives such as Te Korowai o Te Tai Marokura in Kaikoura, which radically alter conceptions of community, economy and the commons and embed a deep challenge to the idea of private property within Aotearoa New Zealand's environmental management. In these practical examples, the commons is a resource for enhanced use of resources rather than a barrier to development or a cause of a tragedy of over-exploitation (see e.g., Mansfield 2004; Linebaugh 2014; Gibson-Graham et al. 2016)

Alongside 'sustainable development', the RMA makes explicit provisions for public consultation and participation, to which TLAs must attend. The RMA also imposes obligations to consider Māori rights, values and interests. These three considerations (sustainability, participation and Te Tiriti) have become pivotal operational foci of the regulatory regime, yet have been subjected to a dominant ethic of development that is enshrined in established, accepted and expected practice.

The environmental management regime centred on the RMA offers environmental sustainability, participatory decision making, and Māori economy as three possible pillars for a future blue economy. Yet, the possibilities of doing economy differently and building a blue economy are obstructed by the absence of an alternative ethic to growth-centred development – an ethic that embraces conceptions of just environmental and social futures.

Pressures for change, however, are emerging. As Māori become more prominent economic, political and regulatory actors, the three concerns are being increasingly interwoven into a deeper challenge to Treaty Partnership and how to deliver it that encompasses new ethics of futures thinking.

Elsewhere, yet in close conjunction, the Sustainable Seas Challenge has offered up and demonstrated the value of EBM as a fourth pillar that centres ecological concerns. In this report we suggest that a growing groundswell of interest in just transitions presents a potential fifth. We discuss the possibilities inherent in both these concepts in the following section.

10. Blue Economy transitions – from sustainability to just transitions

The previous section establishes two propositions:

- A blue economy as an aspiration requires alternative transitions pathways that offer up new directions for genuine change.
- Transitions to a blue economy must involve changing the way Aotearoa New Zealand utilises/manages its marine resources.

There is a growing body of research and literature around how to manage for transitioning to more sustainable and just economy-environment relations (Connolly and Lewis 2019). This literature points to the importance of identifying pathways to different futures and how communities might intervene to remove key obstacles of existing practice and institutions.

Transitioning to a blue economy will mean managers have to re-examine the assumptions embedded in existing environmental management regimes to transform current economic and environmental practice. Change will entail shifts in behaviour, but this will need to be grounded in fundamental change in how Aotearoa New Zealand practices economy rather than simply environmental education and tweaks in incentive structures.

Our research makes it clear that reluctance to re-examine these assumptions has come with a clear set of consequences:

- limited engagement with the uncertainty, openness and potential of change
- too little attention is paid to the subjects and communities who must bring about change and their relationships with places where change must be achieved
- managers and policy agencies have been slow to grasp and extend the potential of transitions emerging from below from social movements, corporate social responsibility, and new transitions-oriented enterprises
- established and intransigent thinking and the interests that lie behind it have not been confronted

The lesson from the research in the CVBE is that public negotiation of resource economy in the commons presents opportunities to do economy differently through an environmental management that commits to 'just' transitioning and the cultivation of possibilities and collective commitments. In what follows we identify a range of potential transitions vectors and pathways that will make it possible to harness and extend the pressures for change and emergent examples of blue economy outlined in Section 7.3.

10.1. Ecosystem-based management

The Sustainable Seas National Science Challenge (SSC) has been mandated to promote a greener marine economy and enhanced ecological health by creating new socio-ecological

knowledge and exploring the possibilities for change. Reinterpreted as economic management, EBM is one policy formation that might begin to shape how we do economy differently. It shifts its focus away from antagonistic, adversarial relationships between economy and environment/ecology.

Instead, it encompasses concerns with economy-environment relations in relational terms, addresses relations among and between human and non-human actors, rescales management to the location of practice and effect, deals with cumulative effects, and positions economy in non-abstract terms as community livelihoods. EBM principles also emphasise the significance of working with communities (Hewitt et al. 2018). EBM connects the environment, regulation and investment, and human activity through explicitly BE principles.

An "ecosystem approach" to environmental management has been discussed in the formal literature for many years (Hewitt et al. 2018) and is increasingly being adopted internationally as a set of core principles for building resource management regimes that recognise ecological and socio-cultural vulnerabilities in relation to natural resource economies. International interests such as the Convention on Biological Diversity (2006), to which New Zealand is a party, have emphasised an ecosystem-based approach.

In the context of Aotearoa New Zealand, the term 'EBM' has been increasingly used in the last decade as a concept for marine management. It has been redefined to emphasise the rights, interests and knowledge of Māori as indigenous people and Treaty of Waitangi partners.

EBM is defined by Sustainable Seas as: 'A holistic and inclusive way to manage marine environments and the competing uses for, demands on, and ways that New Zealanders value them'. This definition is set out as a set of interconnected principles and associated guidelines and practices:

1. Governance structures provide for Te Tiriti partnerships, tikanga and mātauranga Māori.
2. Place and time-specific ecological complexities and connectedness and present cumulative and multiple stressors, as well as those that might occur with new uses, are considered.
3. Humans, along with their multiple uses and values for the marine environment, are considered as part of the ecosystem.
4. Healthy marine environments, and their values and uses, are safeguarded for future generations.
5. Collaborative, co-designed and participatory decision-making processes are used, involving all interested parties from agencies, iwi, industries, whānau, hapū, and local communities.
6. Decisions are based on science and mātauranga Māori and are informed by community values and priorities.
7. Flexible, adaptive management, appropriate monitoring and acknowledgement of uncertainty are promoted.

Looking to alternative models of the RMA in relation to EBM, Davies and colleagues drew on these principles and insights from a workshop run with environmental managers in December 2018 to distil a set of applied management principles (Davies et al. 2019, pp. 12-13):

- The adoption of management approaches that operationalise Te Tiriti o Waitangi
- The adoption of relationships and responsibilities that care for both the natural and human (social, cultural and economic) environments.
- A ki uta ki tai (mountains to sea) approach is important to understanding and addressing management issues of scale (spatial and temporal), connectivity, cause and effect.
- Intergenerational equity
- Widely informed management that sources multiple knowledge systems (eg mātauranga Māori, local knowledge and science)
- A precautionary approach to management and decision making around economy-environment relations
- Respectful and independent processes that are transparent, inclusive, participatory, independent and accountable
- A flexible and adaptive management approach

Within New Zealand, several of these EBM principles are incorporated in management systems, although rarely all of them and not always in a fully consistent manner. *EBM principles imply altered economic practice but are rarely interpreted as economic in and of themselves and tend to read as guidelines for making trade-offs with economic growth*.

We interpret the principles as a clear structure for a *future legitimate and productive applied stewardship and utilisation of resources for a blue economy*. They supplant the privileging of private property interests written into the RMA and the adversarial system in which it operates with a holistic, precautionary and inter-generational environmental management.

Crucially, we see them as emphasising that:

- environmental interests are part of economy, not costs or trade-offs for economic growth
- the measures of ecosystem services that animate much of EBM thought must embrace and be interpreted in terms of social interdependencies and the potentiality as well as the limits of collective action to deliver EBM (see Barnaud et al. 2018)

Read in these terms, the EBM principles provide bases for actioning a new and holistic interpretation of economy-environment relations in terms of priorities negotiated in terms other than present calculations of future income streams; that is priorities that are set in terms of social interdependencies, the potentiality of collective action, and relations between social and environmental justice.

This applied recognition and introduction of EBM principles in management regimes opens up impetus for blue economy thinking. Not only are its principles and underlying propositions wholly compatible with BE thinking, it introduces incentive to change and arguably requires blue economy thinking to be successful.

10.2. Just transitions thinking

Creating an enabling environment for a blue economy will require the creation of opportunities for more ethical, ecologically driven and livelihood focused investment. It will require a flexibility that allows communities to negotiate opportunities and contest ethical practice, and a new form of certainty and stability in regulation based on ethical coordinates that value enterprise and opportunity as platforms for economic development over the idea of a pre-established level playing field defined by rules and refereed by courts.

The idea of just transitions being picked up in the international literature as a key concept for establishing certainty and clarity through shared commitments to just outcomes.

In New Zealand, just transitions thinking has entered policy directly through concerns with climate change[13]. Picking up on international commitments to climate change and the work of international institutions and NGOs, New Zealand agencies are beginning to address the question of how to achieve sustainability, ponder more radical interventions, and position environmental concern more firmly alongside wider issues such as community participation and recognition of Te Tiriti.

As yet, however, they have not gone much further than addressing climate change and emissions and what it takes to encourage industry and community to change practices. Opportunities for transitioning are poorly understood and restricted by silo approaches (issues, sectors), unsympathetic regulatory frameworks, and conflict with present traditional sector industries.

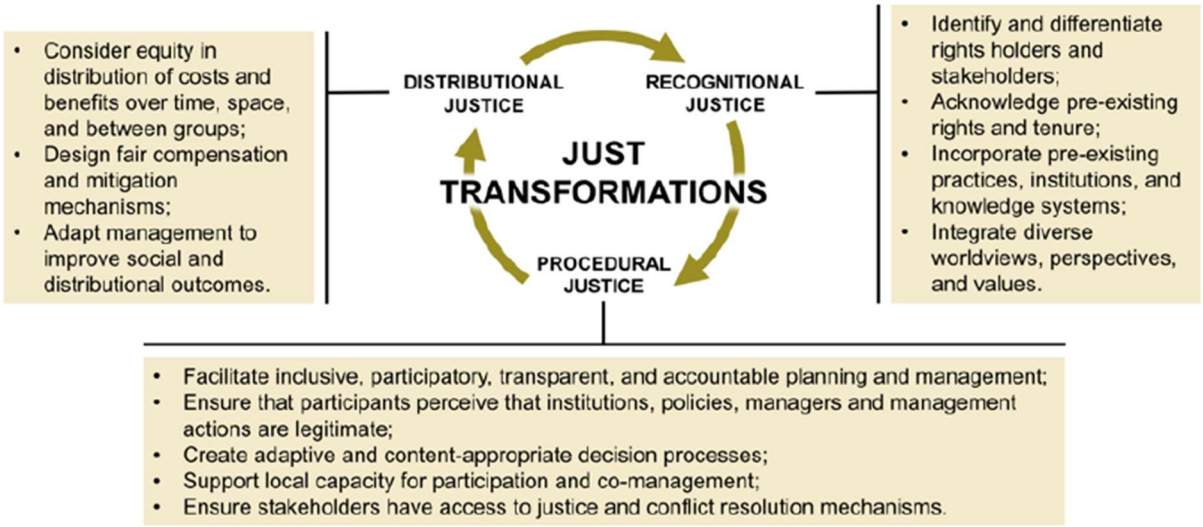
For Māori, the notion of just transition highlights deeper concerns of justice to do with recognition and redistribution of rights and resources (see, for example, https://www.nzaia.org.nz/jameswhetu.html). The prospect that this fertile concept might be reduced to carbon off-setting and climate change response is at best frustrating.

Informed by work with First Nations peoples in relation to marine resources and questions of moral economy (Pinkerton 2015, 2017; Foley and Mather 2019), recent just transitions thinking

[13] In 2019, the Government hosted a Just Transitions Summit (https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition/). The idea has been picked up by the Parliamentary Commissioner for the Environment (PCE), MfE (https://www.mfe.govt.nz/climate-change/climate-change-and-government/climate-change-programme); MBIE, which has established a Just Transitions Unit (https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition/), and the union movement (https://www.etu.nz/justtransition/)

within the literature goes further (Bennett et al. 2020; Cisneros et al. 2019; Bennett 2019; Bennett et al. 2019).

Figure 18: Key considerations and guidance for just transformation management



Source: Bennet et al. 2019

'Just' transitions in this respect are radical shifts in social–ecological relations initiated by intentional interventions (Bennet et al. 2019). This thinking points to more relational, open-ended and practice-oriented conceptions of transitioning and centres questions of ethical practice. For Bennet and colleagues, for example, transitions in marine economies must be grounded in both environmental and social justice, and in turn involve recognitional, procedural and redistributive justice:

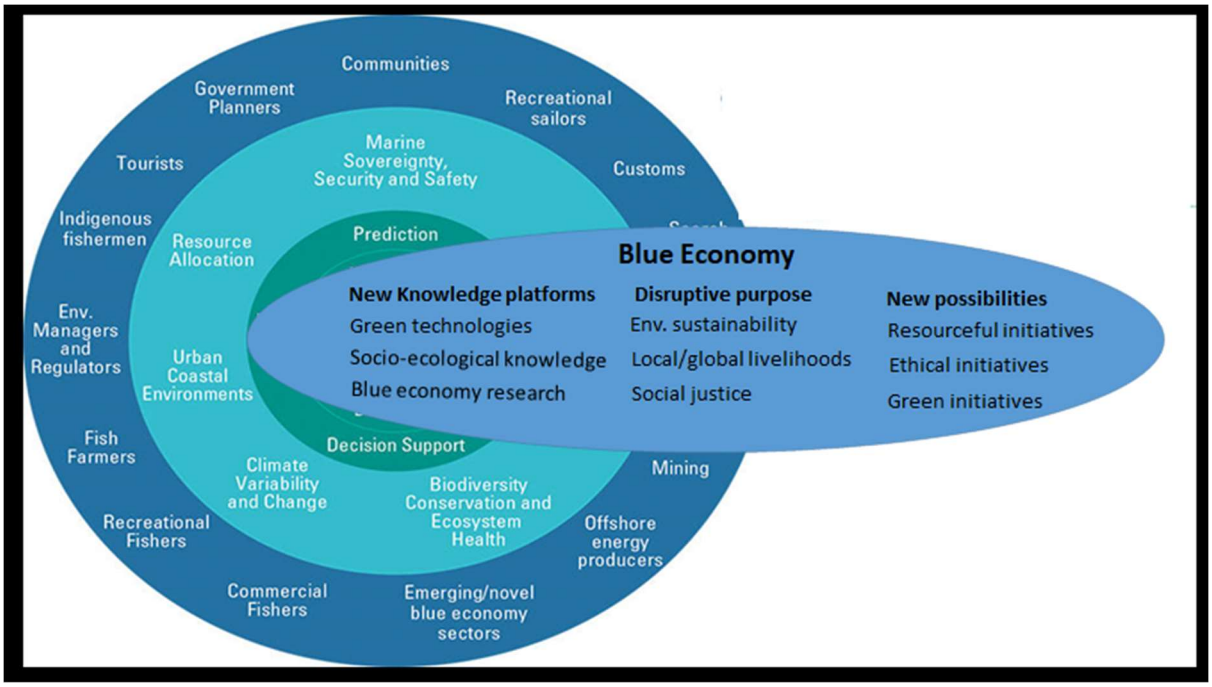
- "Recognitional justice refers to the acknowledgement of and respect for pre-existing arrangements as well as the distinct rights, worldviews, knowledge, needs, livelihoods, histories governance arrangements as well as the distinct rights, worldviews, knowledge, needs, and cultures of different groups in decisions;
- Procedural justice refers to the level of participation and inclusiveness of decision making and the quality of governance processes; and,
- Distributional justice can be defined as fairness in the distribution of benefits and harms of decisions and actions to different groups across space and time."

Achieving just transitions entails disrupting established investment patterns, regulatory frameworks and political alignments. It is a call for radical change in the face of contemporary social-ecological crises and the possibility that we far fast approaching tipping points with

unpredictable consequences for environments and humanity. Transitioning from adversarial, business as usual relations between environmental wellbeing and consumptive economic growth to an economy that promotes environmental and community well-being is imperative for both ecological and social sustainability.

If we revisit Figure 3, it is clear that we need to impose an explicit sense of transitioning on conceptions of blue economy. Figure 19 below uses the same disaggregated doughnut mode of a blue economy to impose a just transition. The correction signals a disruptive purpose and names key knowledge initiatives and content-full possibilities. That is, it signals a directionality and a purpose or mission to change that transcends growth.

Figure 19: Just transitions in a blue economy



Source: Adapted from *Australian Marine Science Committee (2015)*

The concern with dynamics and transitions places an accent on the real place-based dimensions of blue economy success. The notion of 'resourcefulness' is important in this respect (Lewis et al. 2020). It emphasises two dimensions often backgrounded in discussions about resources:

- the 'resourceness' of land or sea is not intrinsic, but is assembled from bio-materialities, environmental qualities, social relations such as regulation, markets and business models, knowledge and technology, and socio-cultural and environmental values and opportunity
- capability in rendering natural resources usable, where capability is understood as an asset for collective practice and transformation

In tandem these two dimensions of resourcefulness refer to the real opportunities of meaningful place-based development as opposed to the abstractions of measures of growth. The content of ethical concerns, justice and research orientation are not for us to prescribe; rather they need to emerge organically from the development and management models we introduce below.

Finally, at a practical level in terms of the central antagonisms framed into being through our current approaches, 'just transitions' to BE will not occur through the actions of private actors alone. 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. Support from the state through setting strategic priorities and legislative and fiscal settings is essential, and innovation from all sectors is pivotal.

This implies social as well as technical innovations in re-organising economic activity. In the Aotearoa New Zealand context, we have identified business champions who embrace the challenge and are already addressing it. These leaders tend to recognise the opportunities offered by community-engaged or community-led development and accept that disrupting business as usual must extend well beyond the 'growth within limits' orientations of mainstream sustainability discourse and the asymmetrical power relations of 'social licence' (see Newton et al. 2018).

In short, if transitions are to be imagined and sustained, they must be ecologically effective, legitimate and 'just'. New understandings will be required of the interplay between monetary and non-monetary economies to support value creation; co-benefits with present industries will need to be sought; and new forms of accountability, measurement and management will need to be developed.

Aotearoa New Zealand has begun this process of transitioning in interesting ways from the bottom-up by adopting green technologies, sustainability ethics, and new initiatives in creating social and economic capability that shift debates from resources to resourcefulness. Successful transitions will require building on and sustaining these trajectories.

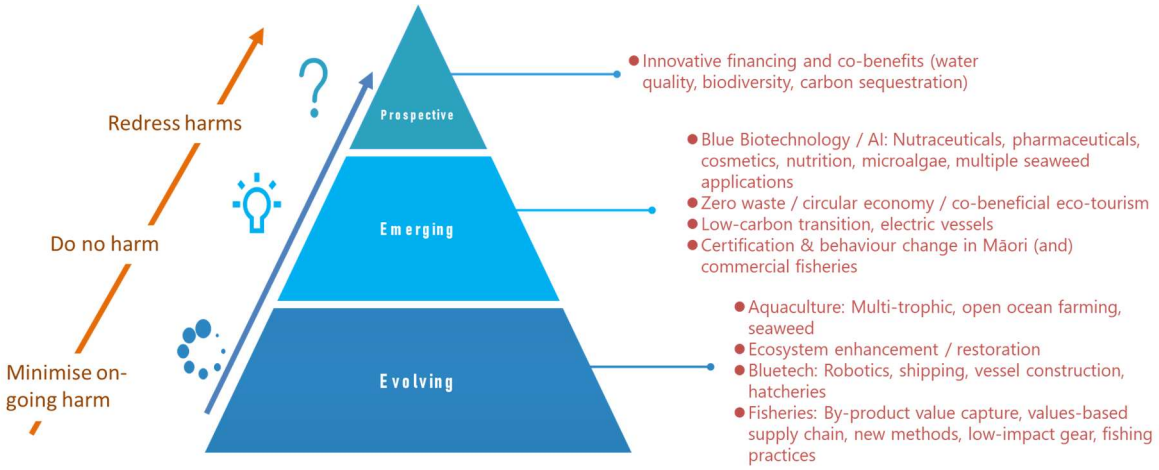
In a New Zealand context, 'just transitions' has entered the discourse of environmental management in relation to climate change. It is likely to extended via a proliferation of global and local commitments to sustainability to the application of new technologies and standards to existing marine economy activities and interest in regenerative economy.

10.3. Building on emerging change

Figure 20220 formalises what CVBE has shown to be an emerging and evolving set of activities, mostly at production level, using new technologies and new visions as New Zealand starts to

transition to a BE. It positions current initiatives (Section 7.3) within potential transitional trajectories emerging from within the business world. Enterprises are experimenting with new technologies and improved ecosystem management, through to emerging activities such as blue biotech and zero waste/circular economy environmental management techniques, which emerge from or imply shifts in aspirations and/or investment objectives.

Figure 202: Transitioning to the emerging Blue Economy



Envirostrat (2019) positions these initiatives in a transitional hierarchy from those that are already instantiated and directed at minimising harm to those that lie on the horizon and may potentially work to redress harm. Prospective possibilities include innovative financing, which may write regenerative visions directly into the returns expected by investors.

The model provides a foundation for thinking through possibilities of more orchestrated blue economy transitions. It suggests that Aotearoa New Zealand is tied into a trajectory running from minimising on-going harm through to doing no harm and restoring ecosystems and community-environment relations through sustainable inter-generational livelihoods.

10.3.1. Encouraging circular, regenerative and restorative economies

There are multiple circular economy initiatives in Aotearoa New Zealand that seek to go beyond technologies designed to minimise negative environmental effects. These include Waikaitu and AgriSea's seaweed operations to efforts to recycle discarded mussel shells, LegaSea's Kai ika project, and the use of waste from fishing for aquaculture, pet food and so on.

Regenerative and restorative economies are in their infancy, but interest is rising. In many ways, regenerative economies are the ultimate aim of blue economy. They focus attention on five key principles:

- minimalised resource pressures - renewable resource use, low rates of extraction, replacing non non-renewable resources (especially in relation to energy)
- low-consumption lifestyles and wasteless production, e.g. co-operative ownership, sharing, recycling, renting of low-use items
- localisation of economies - resilience borne from local knowledge, inter-relations and exchange, with extra-local relations (e.g. globalised trade flows) existing to support local economic foundations
- cooperation, co-learning and co-development as a platform for localised economies, knowledge transfer, and social and environmental justice
- the promotion of life and vitality over growth – encouraging thriving economies rather than growth per se (Roelvink et al. 2015; Raworth 2018), with growth seen as a key target at certain times and in certain places rather than always and everywhere

These ideas are gaining momentum, not as alternatives to exporting, trading or a market economy per se, but as alternative rationalities for economy and alternative conceptions of wealth and success. They can be aligned with export-led growth strategies but are valuable in their own terms. are aspirational and must be addressed through a mix of short and long-term policy making. They have strong alignments to Māori economy.

Restorative investment programmes are one initiative attracting interest from regional councils and iwi as well as philanthropic, green impact investors, and novel community-scale ecological entrepreneurs. Here, the potential is to devise creative financing arrangements to provide investment for wetland, harbour and mussel reef restoration through alliances between investors (looking for green returns), local governments, iwi authorities, and regulatory agencies (looking to fund and discharge environmental guardianship responsibilities), hapū, whānau and communities (looking to participate in restoring their environments); as well as with existing resource-using producers (looking to foster renewable and healthy marine resources for their enterprises).

Realising this potential will require creating an enabling environment for restorative economies, one that focuses on investor interests in different scales of investment, alternative measurement of restorative/regenerative returns, and a degree of certainty with respect to markets, standards, prices, regulations and consents.

The CVBE project has engaged closely with another form of regenerative economy initiative - US regenerative ocean collective Greenwave (https://www.greenwave.org/). Grenewave aims to proliferate small-scale, environment/community-centred, multi-trophic enterprises as an alternative to large-scale monocultured aquaculture. Its business model is centred on building community-focussed collectives of multi-trophic aquaculture initiatives that will deliver ecological regeneration and benefits for multiple groups of stakeholders.

CVBE researchers engaged with Greenwave's proprietor Bren Smith in 2018 and investigated the possibility of bringing him to New Zealand at that point. New Zealand was not at that point ready for the initiative.

Greenwave has, however, recently committed to becoming involved in Aotearoa New Zealand's next wave of aquacultural development. It has established a firm relationship with Aotearoa New Zealand partners, including philanthropists, aquaculturalists, and iwi. Formalised in September 2020, this relationship has been cultivated and brokered in large part by CVBE partner Envirostrat and has been stimulated by the Challenge's Blue Economy research programme.

The Greenwave model is a promising foundation for transitioning to a blue economy, and one that will complement larger-scale, off-shore aquaculture initiatives foreshadowed by prominent industry actors. It will also dovetail with Māori economy initiatives at multiple scales. These are also regenerative in design and aspiration, be they customary, whānau-based enterprises or iwi and pan-iwi led development initiatives guided in part by mainstream economic logics.

10.3.2. Developing and applying new technologies

Transition pathways must be built. This will involve innovative investment and policy/regulation, creative identification and capturing of multi-benefits, altered commitments by public actors and private managers, and the production of new knowledge (regulatory, scientific, and technological).

Aotearoa New Zealand is investing heavily in research and development, including new technologies and environmental science, and commercialisation (Table 7). Much of this research can understood in sectoral terms. Some is infused with concerns with environmental change and sustainability and some industrial technologies promise disruptions to business as usual that signal new ways of doing economy as well as opportunities for new low-emissions production and blue-tech products.

Table 7: Technology investments in New Zealand's marine economy

	Industry	**Technology examples**
1	Offshore / Open Ocean Aquaculture	Mobile production systems that are resilient to the offshore environment and require minimal human operation
2	Integrated Multi-Trophic Aquaculture / New Species Aquaculture	New farming structures, novel compatible species, harvesting & culture techniques for multispecies systems, feed conversion rates, circular nutrient economies
3	Seaweed Farming	Development of new seaweed culture systems, hatcheries, and niche products unique to New Zealand
4	Bioprospecting	New nutraceutical / pharmaceutical products from indigenous species, genetic improvement

5	Artificial Intelligence	Rapid real time microalgae / pathogen identification, real time catch quality monitoring in fisheries, data driven decision making
6	Low-carbon Transport	Battery powered fast commuter ferries, biofuel for maritime transport
7	Commercial Fishing Gear	Passive fishing devices that reduce or eliminate bycatch, mitigate benthic impact, enhance catch quality, and reduce environmental footprint
8	Carbon Neutral / Zero Waste Industries	Mussel shell recycling, fishing by-products such as fish skin
9	Clean Energy Sources and Production	Tidal / wave energy production, Bio-fuels
10	Upstream and Downstream Infrastructure	Hatchery production systems, product processing plants, value chain enhancement

The point is that, while dominated by the pursuit of technological solutions that are commonly uncoordinated and unaligned with blue economy aspirations (Envirostrat 2019), there is science investment that might provide a platform for blue economy futures.

Examples of innovative technologies include: clean energy, low carbon, and other environmentally focused production processes that will add distinctiveness values; bioprospecting that will yield new high-end consumer products; offshore farming technologies that will reduce inshore environmental impacts; and new hatcheries that can be incorporated into tourism experiences.

The Precision Aquaculture Spearhead Project in the Science for Innovation National Science Challenge, for example, is seeking to build a more coordinated, collective approach to innovation that embraces key principles of blue economy thinking, including EBM.

The challenge is to ensure that new technologies are *values adding* rather than simply cost-reducing, and that they will extend from reducing current harms and pressures on natural resources as ingredients to reforming economy-environment relations in terms of blue-economy principles. The 2020 round of Sustainable Seas Innovation Fund is one example of a change in direction towards blue economy thinking. The projects it has funded have all been asked to deliver blue economy outcomes that commit to local community livelihoods and ecological enhancement. The round has been able to fund a set of projects that locate innovation firmly within mātauranga Māori.

Social innovation is also important. Initiatives such as community-centred governance arrangements (see Appendix 1) address the questions of who gains, by how much and where. Connected to marine resources located in the commons, such innovations connect to Māori marine economy initiatives and can stimulate blue economy gains associated with ecosystem health and community livelihoods.

If blue economy is an open-ended aspiration, all actors in the blue economy will need to respond, adapt and experiment in on-going and shifting contexts. This will need state investment and coordination, but will also need experimentation and investment from investors, regulators, producers, community organisations, and consumers / voters.

10.3.3. Rethinking economy-environment relations at ecosystems levels

Our own research might also be understood as an experiment in bringing about blue economy in relation to EBM.

We argued in Section 1 of this report that standard economic aggregates can be helpful in tracking trajectories of change, but that they have more limited value as measures of horizontal relations in globalised and weakly bounded subnational economic arrangements. One way of thinking about this, is that economic activity or change is rarely measured at ecosystem-level. Economies are not understood as structured at ecosystem scales and financial and trade data is not routinely collected at such scales.

However, production level data is potentially available if not routinely collected at the enterprise level. While claims made about job numbers and returns to enterprise and nation remain subject to the caveats outlined across this report, there is no reason why the properties of physical production itself need not be measured and incorporated into routine EBM. This could apply to both production within ecosystems and the discharging of 'bads' into ecosystems from elsewhere on land and sea.

Key data such as fish caught, vessel visits made, tourists visited, mussel lines farmed, numbers of fish farmed in what conditions and so on is collected. Geocoding could be used to assemble this information at ecosystem scales. The extent and nature of production could then be routinely monitored and measured, as could impacts as part of cumulative effects centred analysis in EBM.

The CVBE project ran a small pilot on how the relationships between the environment and economy might be understood from a management perspective using system maps that trace important inter-connections and feedback loops between economic practices and natural systems (Connolly and Lewis 2019). This would allow managers to consider the impacts of potential interventions such as new investment and price changes at an ecosystems level.

Systems 'maps' were constructed for wild fisheries, farmed fish and eco-tourism. The maps, drawn from a natural capital perspective, outlined broad relationships in the three sectors and key sites and moments of natural change (stock levels and ecosystem well-being) and economic change (price and volume of production). They allowed high order tracking of change on other aspects of economy-environment relations and analysis of a small set of potential interventions in fishing, aquaculture and tourism.

The models are well short of the complexity required for routine management, and we were unable to feed live or real-time scientific or economic data into them. However, they do point once again to the importance of cumulative effects and what we do not know about them in

marine ecosystems, especially in multi-use environments (Davie et al. 2019). Several points are important here:

- cumulative effects and multiple uses are bound in complex inter-relationships - changes in one element of economic-environment relations flow-on to effects elsewhere
- the quantum of effects are hard to estimate and neither economic nor environmental data is currently available at the level of granularity necessary to operationalise routine EBM within permissive, adversarial effects-based legislative regimes
- the different activities involve different issues and different regulatory mechanisms and intervention opportunities at different points and at different scales – any EBM will need to account for this challenge
- ecotourism involves both consumptive and non-consumptive activities – regulating these different dimensions requires flexibility in approach and would benefit from interventions at product and business model design phases (a lesson here too for EBM in fisheries and aquaculture)
- cross-sector systems-level impact analysis developed for eco-tourism illustrates the potential of the approach to do this multi-use analytical work
- it is possible to incorporate notions of justice-based transitions in EBM

As authorities are asked to develop measures to apply a 'four-capitals' approach to the environmental management of marine space, the maps point to the challenge of well-being accounting and the need to make it flexible and comprehensive enough to get it right at appropriate scales of management. The approach highlights the critical importance in this respect of spatialised data (and with that the challenge of fluidity in oceans) and of considering collection of economic data in appropriate physical units as well as at transactions levels.

10.3.4. Measuring to manage an emerging blue economy

The CVBE project Other uses of marine resources are less commonly monetised or marketed, and arguably not all values can or should be monetised (see the article and surrounding roundtable debate on monetising nature among leading international commentators stimulated by the Great Transition Initiative https://greattransition.org/publication/monetizing-nature-taking-precaution-on-a-slippery-slope). There are significant political risks as well as advantages to be gained from valuing nature in monetary terms. Much of these have to do with the broader understandings of economic development and economic good and the regulatory settings within which measures are interpreted and enacted. Again, this makes blue economy and the CVBE project so important.

Commentators insist that the value of the environment should never be reduced to the short-term revenues that human might be able to extract from it. Valuing and monetising

environmental entities and processes in the absence of better ways of thinking economy and economy-environment relations must be resisted.

This includes deriving ways of identifying and prioritising intrinsic environmental priorities that must not be subjected to the trade-off logics that flow inexorably from valuation and monetisation. It also involves more effectively recognising that social values (amenity, recreational, environmental, spiritual and cultural) are economic even if they do not involve market activities. Environmental priorities and social-cultural-spiritual values are economic in that they involve livelihoods and social reproduction from marine resources at multiple temporal and spatial scales. They are also pre-economic in the sense that they transcend the here and now of material human life.

Non-market uses of marine and coastal spaces compete with tourism, fishing, aquaculture and urban development uses. The absence of measures of these values (and their impacts on other activities) means that there is no simple or standard way of assessing and managing competition for access, space, and resources between recreational, customary and commercial fishing. This is problematic for established measurement regimes but may also represent an opportunity to consider novel management regimes (Section 11.2.2).

Wider definitions of non-use values pertaining to ecosystem services and the economic benefits of biodiversity would also extend concern to a sounder blue economy perspective. Ecosystem services generate real economic benefits for society, as well as countering externalities (Rullens et al. 2019; BArnaud et al. 2018). They extend to the use of estuaries and oceans as sinks for discharges from land-based industries (urban development, forestry, agriculture and so on). Biodiversity also promises present and future economic benefits associated with bio-resources, which may or may not yet be interpreted in resource terms.

Internationally, interest in ecosystem services has produced measures that monetise the costs of pollution, create natural capital accounts, and encourage innovative financial models for ecosystem recovery and restoration. Restoration values are beginning to be measured and monetised through green financing, as well as by regulators calculating consenting offsets and mitigation costs (Envirostrat 2019). Measures of natural capital and impacts upon it by development activities are now sought for new national accounting systems (Neill et al. 2020).

Open ocean accounting and measurement of natural capital is high on the agenda of many international blue economy programmes (Ebarvia 2016; Colgan 2016, Fenichel et al. 2020). Methodologies are emerging to incorporate ecosystem services and non-monetary uses into economic measures (van Zyl & Au, 2018; World Bank, 2011). These interests dovetail with Aotearoa New Zealand's efforts to build new economic measures to support Treasury's novel four capitals/well-beings and Living Standards policy frameworks.

However, there are significant technical, ethical and political barriers to individualising values and monetising ecological processes and biological actors. As *The Great Transition Initiative*

debate reminds us, there remains considerable contest over the economic values of ecosystem services and how to measure them. Deriving accepted, stable, and fit for purpose measures of values comes with a particular range of challenges in Aotearoa New Zealand (Envirostrat, 2019; Rullens, Lohrer, Townsend, & Pilditch, 2019; Townsend et al. 2019; du Bray et al. 2019; Geange et al. 2019; Dymond 2013).

Māori have particular interests in and concerns with many of the uses and values not currently measured, including environmental wellbeing, recreational or customary uses, and cultural and spiritual values (Rout et al. 2019; Farmsworth and Awatere 2016) They also question the appropriateness of monetising customary uses, cultural values and environmental processes and non-human actors, and have concerns about how measurement regimes might become inappropriate management tools in relation to Treaty Obligations (Scobie et al. 2020; Scobie and Love 2019).

Measurements are underdeveloped in Aotearoa New Zealand (Envirostrat Ltd, 2019), and measurement is seen as a pivotal issue in the context of natural capital accounting. Ecological research in Sustainable Seas, however, reiterates the precautionary concerns of international commentators, while other research within the challenge questions the value and utility of measuring social values as a way of overcoming the inevitable politics of resource management decisions (Tadaki, Sinner, Stahlmann-Brown, & Greenhalgh, 2020).

The collection and management of indigenous data is similarly underdeveloped, although researchers are laying the groundwork for indigenous management processes and co-management and co-governance arrangements (Rout, et al., 2019).[14] Māori researchers are endeavouring to utilise mātauranga Māori to derive a mauri-based measurement (and related management) regime.

The deeper challenge is to *develop fit for purpose objects of management and fit for purpose measures to support them*.

Two initiatives are promising: (1) developing better ways of aggregating and analysing physical measures of economic processes (numbers of tourists, mussel lines, vessel trips, catch and so on); and (2) the prospects of big data technologies and methodologies to map economies from the level of transactions up through accountancy software. While not yet embraced anywhere, the possibility of transactions level data promises a more flexible, problem-specific construction of measures and calculation and aggregation of effects across activities. It may allow for measures that *identify and evaluate cumulative effects through complex connectivities* and promises a new era of data-led, activity-level management of economy-environment relations.

[14] See https://www.taiuru.maori.nz/data-is-a-taonga/. See also http://www.journal.mai.ac.nz/content/measuring-m%C4%81ori-children%E2%80%99s-wellbeing-discussion-paper.

10.3.5. Making economic rents work for the collective: People and place

Three points of contradiction have struck us in talking to informants and reading policy analyses about value creation in the blue economy:

- the undeniable, albeit commonly implicit, centrality of the oceans as commons in all questions of management, development or transition; yet the failure to address questions of distribution and justice
- the depth of recognition of different values associated with the oceans; yet the poverty of trade-off thinking, the uneven power relations that it supports, and the failure to address multiple values in decision making about resource use
- the concern with economy-environment relations; yet the failure to unpack and study these relations in grounded, socialised and ecosystem specific settings

These three contradictions have animated all the workshops in which we have participated and the each of the interviews we conducted. They lie at the core of Sustainable Seas, its potential, and the form that is has taken as it has unfolded. That is Sustainable Seas is lively, exciting and at times controversial because the oceans are a commons in which rights and interests are contestable and contested, and the collective matters.

Our discussion of just transitions highlights a major hole in Aotearoa New Zealand's economic management processes – the externalisation of questions of distribution. The answer, we believe, to making progress on distributive justice in blue economy lies in reviving debates about economic rent.

Economic rent is 'the surplus revenue after deducting all production costs including a risk-related return on investment' (Auty and Furlonge 2019:3). Rent is different to profit derived from a return to risk on investment or enhanced productivity. Rather, it is a premium from a rare or unique resource that cannot be replicated, and/or privileged access to such a resource (often monopoly access and often secured in law or regulation).

Rent is central in capitalist dynamics but has been largely ignored for 100 years by mainstream economics, as an explanatory concept and an object of economic management.

Aotearoa New Zealand's Quota Management System (QMS), for example, is built on the rent associated with scarce fish and the environments that support them. Industry investment and production dynamics take form around the rents associated with quota, which lies at the core of fisheries management, and its successes and weaknesses (Reid et al 2019; Peart 2018, Winder 2018; McCormack 2016, 2018a 2018b; Bargh 2014; Hamilton-Hart & Stringer 2016; Carothers and Chambers 2012). The rents bound up in the quota are where the appropriable value lies, yet rents are rarely discussed in connection with debates about the QMS.

The QMS is globally recognised and locally celebrated for enshrining a limits-based conception of sustainability in management, its effectiveness in preventing fishery collapse, and the

foundations it laid for a consolidated modern industry. It has clearly left Aotearoa New Zealand with fish stocks and we have a modern industry. Allocating quota to iwi as part of the industry sustainability solution has contributed significantly to Māori economy, within marine spaces and more widely. Whilst the mechanics of iwi and pan-iwi administration of property rights have provoked criticism from Māori, the allocation of quota and the rents generated from it have proven a pivotal moment in the assertion of tino rangatiratanga. For nations struggling with any or all of these issues the QMS is often seen as an exemplar.

However, the QMS is not without its critics. Some argue that it has failed to arrest the long-term decline of inshore fisheries (Peart 2018). It is also criticised for privatising the commons, squeezing out small-scale fishers and processors, disincentivising technological change, creating a management system based on outmoded science, generating a rights-based culture that stands in the way on more dynamic regulation, and giving away ownership of the commons to particular individuals and groups. Further, debate tends to focus firmly on property rights, with counterfactual questions rarely posed (could, for example, the QMS have taken a different form and how might it now be improved?).

Whatever its effects[15], the QMS operates around tradable rights to extract rent from a scarce resource, the access to which is controlled by private ownership and regulation. As that scarcity increases and prices locally and globally rise in response, the rents increase. Irrespective of the extent to which they are now priced into quota, they continue to flow and have been (or will be) extracted from exclusive access to the commons by a 'private' entity that has been given (or acquired) exclusive rights.

Key questions, however, remain. These include:

- as the price of seafood rises in relation to global scarcity, who should benefit from the rents?
- as government finances the science behind aquaculture and allocates space, who should benefit from rents?
- should returns to the commons be distributed more widely?

Some of the answers to these questions lie in the success of Māori ownership secured by Treaty-based allocation of fishing quota and aquaculture space to Māori. Treaty settlements in respect of marine spaces have dealt with the commons and the rents latent within them by apportioning some to Māori stewardship. Collective ownership via iwi connections has meant that rents are available for distribution, questions of distributive justice are being addressed, and rents are being distributed locally.

[15] The literature is divided on just how effective the QMS has been in safeguarding sustainability – in absolute terms or in terms of other potential solutions that for historical-political reasons were not explored or adopted (Winder 2018).

The case demonstrates that there are opportunities to distribute rents to local communities and environmental stewards, and thereby recognise the commons. Iwi based property rights is one solution as they represent collective benefit, but there may be others, especially as Aotearoa New Zealand moves to make aquaculture space available, addresses bioprospecting, and considers offshore minerals (see Section 11.2.3).

Indeed, the relationship between the SMV Consortium and the Golden Bay Community Trust is another example (Hindmarsh 2020), and one that has the added advantage of bringing together multiple enterprises around shared technologies as well as returning rents to communities (Section 7.3.7). With consented space turned over to local ownership, space is available for economic use but returns rents to local communities and gives them responsibilities and financial opportunities to develop livelihood and/or environmental/restorative projects.

As a starting point to these debates, we treat rent as *geographic rent* or a return to place (Lewis et al. 2013; Lewis 2017; Lewis et al. 2020). This is generally appropriated by capital, but in the commons conceivably 'belongs' to natural environments and the communities that steward them. Thinking in this way:

- offers a basis for understanding and stimulating collectively initiated interventions and institutional initiatives such as regional development, as well as community-led projects that mobilise common resources
- points to possibilities of rent creation from careful management of commons or investment in social infrastructure – it helps to secure economy as less adversarial forms of practice in EBM
- highlights sources of value in place, from land and resources to place-specific configurations of social and physical infrastructure and capital – it internalises community in questions of EBM
- points directly to distribution, distributional justice and how to return the goods of the commons to place (e.g. regional royalties)
- allows for a participatory management regime that accommodates questions of distributional justice as well as recognitional and procedural justice in plotting transitions to, and creating new values in a blue economy
- promises to make rents 'place-sticky' to return them to their communities and to the support of local environments

10.3.6. Taking lessons from Māori economy

Much of what we have discussed in this section can be achieved within an overarching commitment to indigenise blue economy. What is meant by indigenising blue economy and how this might be achieved is a deep challenge (Reid et al. 2019; Nursey-Bray and Jacobson 2015). We used the work of Reid and colleagues [Section 8.4.5) to comment on what a Māori marine economy might look like. Here we suggest with no further elaboration that such an

economy equates with our definition of blue economy and aligns with each of the other dimensions of emerging blue economy that we outline in this section.

That such an economy in large part already exists is a powerful foundation for proliferating it via new initiatives and by bringing its values, practices and investment capital to bear on other domains and operations within existing marine economy. Elements and possible outlines of such a wider project of indigenisation are set out by Reid and colleagues (2019). However, bringing about an indigenised blue economy will require decisive intervention and on-going attention and new scientific and other investment.

11. Conclusion: Blue economy futures

The previous section lays out a set of guidelines as to how build a blue economy by addressing the management of economy-environment relations. At their core lies a multi-faceted need to:

> *Enable, enhance, enact and extend current resource and environmental management processes by securing existing pillars of sustainability, participation and Te Tiriti with meaningful and actionable ethics and principles and ethics drawn from EBM, just transitions, and emerging understandings of how to action Treaty Partnership.*

Directing attention more specifically at the nexus of investment-production-distribution, we suggest that creating value from a blue economy must:

- Build on the initiatives of champions
- Encourage circular, regenerative and restorative economy
- Develop and applying new green-blue technologies
- Direct attention to relationships between the commons and rents, paying attention to the appropriation and distribution of rents, and pursuing place-sticky rent-based development opportunities
- Take lessons from Māori economy

In this concluding section, we take a step back to thinking about the policy-investment nexus of economic development. In this sense we preface our comments with three observations.

First, change is political. Research on economic development is always political – in design, methodology, and impact. Our research was initiated with the aim of stimulating more sustainable economic action in marine spaces as a platform for value creation, but without a strong sense of what that might mean. Its methodologies were designed to give us that understanding: to collate, interpret and synthesise relevant existing blue economy practices and emerging understandings of possibilities and barriers to value creation.

Second, social research, including economic development, is also always context dependent. Much has happened over the course of the CVBE research, most notably the centring of the

concept of blue economy within the Challenge, and, at the tail end of the project, the arrival of Covid-19.

Third, as a consequence of the social nature of economy and the political nature of research, useful research evolves. Reassuringly given the Challenge mandate to disrupt business as usual, we have ended up in a set of unexpected yet generative places.

This final section of the report outlines where we have reached and a set of suggestions as to where Aotearoa New Zealand needs to go to create value in a blue economy.

11.1. Blue economy as aspiration

We interpret the blue economy as *less a thing and more an aspiration, challenge and an opportunity*. As a result, creating value in 'the' blue economy is about more than imagining the next technology, product or regulatory change. The challenge is to *enhance national and regional resourcefulness* to support diverse forms and settings of entrepreneurialism, much of which is already in train.

In short, while far from fully achieved, Aotearoa New Zealand's blue economy is being brought into being as *an assemblage of activities that utilise marine resources to generate livelihoods, support lively communities, and enhance ecological health*. It is an aspiration with which many are experimenting.

The project set out to conduct research that would support iwi and stakeholders to challenge business as usual. When we started, we encountered expectations from interviewees and workshop attendees that we would produce new measures for economic sectors, measures of natural capital or ecosystem services, or, in some quarters, measures of anything that might be used either to secure or prevent economic development. Some saw the role of the project as generating an argument for the extension of private property rights into the commons. Blue economy was understood by many as simply an alternative phrase to 'marine economy' rather than as an opportunity and a framework for altering business as usual.

By the time we finished we had developed definitions, concepts, heuristic models and a strong sense of necessary directions for transitioning, all of which were brought to bear on supporting the development of a more applied suite of research projects designed to build a blue economy in Phase II.

The project has *normalised the use of the term 'blue economy' in New Zealand* and has performed the *conceptual, empirical, and collaborative work necessary to secure its use as an aspirational concept*. This has made the idea of a blue economy available to drive commitments to sustainable seas in settings from public discourse to hui, policy making rooms, and industry tearooms, boardrooms and conferences.

In this report, we have outlined a series of specific contributions in this regard:

- disrupting the conceit that 'the number' is always right and the number is all there is or should be – and the power that lies in that conceit to direct the future of the oceans
- replacing the restrictive sector-based and under-measured understandings of marine economy with richer and more expansive understandings – remeasuring the marine economy as nearly double its understood size
- inserting coastal tourism more firmly into policy, research funding, and popular imagination of the marine economy
- presenting a model of an Aotearoa New Zealand blue economy
- modelling the defining entanglement of marine economies – both systematic (value chains) and case-place specific enterprise level maps
- narrating a set of emergent blue economy initiatives and their champions, which indicate the possibilities of doing economy differently
- reinterpreting economy-environment relations as co-constitutive and open and opportunities laced rather than fundamentally antagonistic, and confronting the language of trade-offs in multiple public, policy and industry forums
- delivering a variety of conceptual tools for blue economy management – a model of the Aotearoa New Zealand blue economy, new measures and an enhanced methodology for measuring marine economy, sector-based, systems oriented models for tracing shocks and interventions, a blue economy development model, and an opportunities based resource management model.

The project carried out the conceptual and empirical work necessary to demonstrate the value of a blue economy approach for Aotearoa New Zealand. It has demonstrated that such an economy is emerging, but that further transitioning from today's marine economy is required to realise the values-creation potential of blue economy.

We end by laying out a set of specific transitioning initiatives – a blue economy development model, a national oceans strategy and policy, extending the conservation estate, institutionalising just transitions, indigenising blue economy, and kickstarting a set of blue economy initiatives through enactive research.

11.2. Building a blue economy

The initial sections of the report point decisively to the emergence of aquaculture and tourism as platforms for medium-term economic growth in Aotearoa New Zealand. We have argued that they have the potential to establish a powerful platform for a blue economy founded on meaningful local livelihoods, 'place-sticky' rents, and ecologically sensitive activities.

Ecotourism (including regenerative tourism) and regenerative aquaculture offer opportunities for blue economy livelihoods and environmentally sustainable export income generation. Larger-scale, off-shore aquaculture holds similar potential, although the environmental performance of finfish farming remains a subject of intense debate.

Managing the ocean estate to deliver a thriving community economy alongside high value ecotourism and aquaculture at scales and in forms that are low impact and regenerative is a crucial goal. This community economy includes the production of amenity and social values to reproduce society, recreational fishing and seafood gathering. Also crucial to this mix is the adoption of practices that allow for a flourishing local food economy and high multiplier linkages to other foundational economic activities (boat repair, food economy, research and education and so on).

With fishing within the control of the QMS, adopting models that fish for abundance, high values, and long-term returns is a plausible goal and one protected by the global scarcity of wild caught fish. Such approaches can be regenerative. Looking again at the question of rents will be important in any re-regulation of fisheries.

New blue tech-derived products and blue tech-enabled aquaculture production technologies and processing possibilities are beginning to emerge. These offer opportunities to enhance the use of marine resources by using them differently. Much of the potential cited, however, remains promissory. It also comes with risks that it might simply stimulate new commodity industries (volume exports of seafood from off-shore farms or volume outputs of relatively low value-add powders and oils). In addition to pressures on the environment, high volume activities with low local labour content targeted at export markets can tick growth-oriented goals but may not support local economies to thrive (Raworth 2018).

It is implausible to simply rule out commodity exports from the suite of activities in a future blue economy, yet it is irresponsible not to debate their role. A blue economy cannot be based on commodity exports, yet to the extent that they support other blue economy activities, local livelihoods and national goals, they can be fitted in a measured sense into a blue economy.

Large scale land-based dairy and wine commodity economies confirm that assuming commodity production to be the default form of economic activity is the wrong approach. Even more so than on land (Lewis and Le Heron, E. 2018), when production takes place in the ocean commons, local and national communities need to debate the virtues of environmentally disruptive fast-moving consumer goods production models. This is especially the case if the capital is global and the labour non-local. Our research suggests that while proponents of scale-led aquaculture talk of obtaining social licence, our more detailed analysis of possibilities suggests that management models need to allow for more on-going participation of local communities in debating the distribution of rents and the terms of production.

In short, our research suggests that attention to rents and blue economy principles will be essential to ensure that all activities in a blue economy feed positively into future economy, including new commodity exports.

Balancing interests will necessitate better measures and new forms of accounting for the values and impacts of economy (economic, environmental and social). It will also require new models of management that shape future resource use and the trajectories of use within an EBM. Transitions to a BE and EBM are mutually supportive. Here experience from elsewhere in the Challenge (Le Heron et al. 2019; Lewis and Le Heron 2020) points to the potential of participatory approaches to environmental management as platforms for blue economy.

To conclude, we offer four provocative ways forward.

11.2.1. Securing the commons by extending the oceanic conservation estate in creative ways

Extending the oceanic conservation estate to facilitate a new community-focused balance of interests among these sources of value is one model for transitioning to a blue economy. By this, *we do not mean* removing more ocean space from economic use (see Fairbanks et al. 2018), but (1) recognising the full breadth of differently scaled (temporal and spatial) economic, social and cultural values generated by ocean resources in a context of securing their environmental values as a first principle; and (2) increasing the range of regulatory levers associated with managing local uses – especially those open to local communities.

Our research revealed extensive interest in the possibility of using a range of tools to create different forms of conservation space, but did not extend to any analysis of these tools other than to recognise the potential of local leadership of any such initiatives (Le Heron and Lewis 2020; Le Heron et al. 2019). Sea Change and Kaikōura are examples of where creative use of conservation spaces are being (and have been) made to orchestrate spatial planning solutions that stimulate opportunities, resolve contest over use rights and opportunities (rents), and underpin blue economy futures. The Kaikōura case demonstrates forcefully the potential of creative marine spatial planning and use of marine protection areas to stimulate multiple win-wins across economic, social, cultural, and environmental values.

The evidence to date suggests that these solutions require conservation-centred legislative support and commitments to local ownership. *Creative solutions will be local but will need to be enabled nationally*. The solutions suggest a way forward that is more rigorously grounded in blue economy principles than 'social licence', even though establishing such management frameworks may appear to be slower and more costly initially.

All solutions must address questions of Māori rights and interests as a fundamental first step. Framed in terms of kaitiakitanga rather than western notions of conservation, there can be creative solutions.

11.2.2. Institutionalising just transitions in resource management

Our research illustrates that value creation is a process of collective and relational action in the presence of regulation - change agency is social and relational, while action is collective action and collective action is generative.

Creating value in a blue economy must be a *collective effort that assembles environmental resources and social actors into new arrangements in creative ways*. It will require enablement, guidance, and governmental interventions through management frameworks that:

(1) recognise that social and economic change is unstable, indeterminate, and embedded in relational social practice - agency and contingency coupled and recoupled in place and practice, rather than linear, procedural, or individualised
(2) reject the assumption that economy-environment relations are set in a fundamental antagonism (economy and environmental management are bound in fundamental relations)
(3) reject discrete, trade-off focused, and individual-centric decision frameworks and understandings of value adding (social, environmental and economic)
(4) *recognise the complexity, co-dependencies and cumulative effects of environment-economy relations, and the necessity, efficacy and value of collective social action*
(5) embrace the principles of EBM
(6) encourage economic actors to explore new and diverse possibilities for action
(7) enhance resourcefulness in environment-economy relations, including fostering the community goodwill, collective action and commitments that will sustain negotiated compromise
(8) initiate and secure just transitions, including encouraging new ethical coordinates

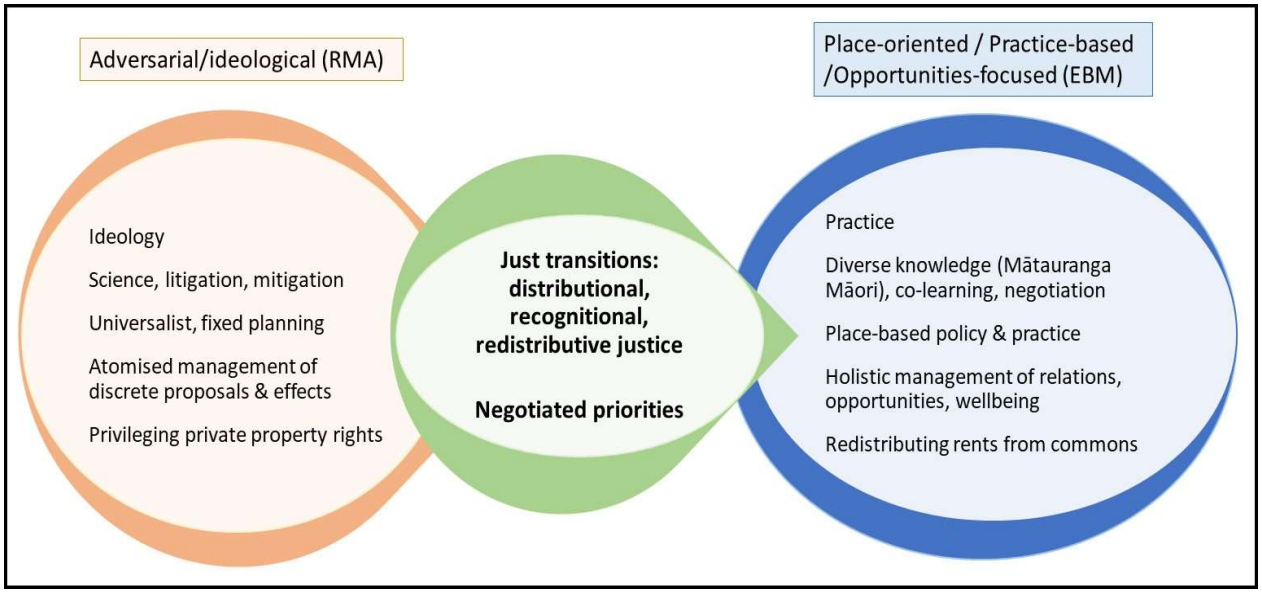
Research in multiple aligned Sustainable Seas projects suggests that whether legislatively predetermined or otherwise, our current environmental management arrangements fall short of providing such frameworks (Davies et al. 2018, 2020; Tadaki et al. 2020; Le Heron et al. 2019; Le Heron E. et al. 2020). The existing RMA-based regime as underpinned by the sanctity of private property rights, guided by a universal understanding of economy and how it should be managed, operationalised, atomised by the management of discrete actions, and informed by positivist science and the interpretation and litigation of its findings. Process is the object of day to day management and universalism is both the procedure and the goal.

Transitioning to a blue economy requires a framework that recognise multiples uses, rights and interests, and cumulative effects and regulate for generative experimentation and just transitions. Just transitions cannot be assumed to emerge from either heroic individual innovation in a permissive rights regime or directive planning, they require goodwill, negotiation, and experimentation.

We considered instead what new institutional conditions might be needed to promote a BE in these terms. In Aotearoa New Zealand there are successful exemplars of such such approaches, including Te Korowai o Te Tai ō Marokura, Sea Change, and the Fiordland Marine Guardians (Le Heron et al. 2019 – see Appendix 1). These experiments demonstrate the creative potential of lived commitments to creating economic value whilst also performing environmental stewardship and social guardianship. They highlight the value of grounded co-experimentation and collective social action, place-based and participatory decision-making, and opportunities-based framing of negotiated compromises.

Figure 21 presents our answer. It imagines a *more generative model for environmental management* carved out of shifts along five defining axes of rationality and procedure in the existing management framework. It presents a place-based, opportunities-driven model of decision making for value creation in a blue economy.

Figure 21: New institutional framework for a Blue Economy



Importantly, while utopian in vision, the model is grounded in three key material realities:

(1) the actual practice of value creation in marine economy and its management, which is social, public-private-iwi in its organisational forms, grounded in place, practice and relations, build on common pool resources, and centred on a contest over rents
(2) pressures towards transitions coming from government, Treaty Partnership processes, international agreements, science, social activism, and markets
(3) actual examples of participatory decision making that point to success in assembling and institutionalising the features of the model in different ways in different setting

This place-oriented, practice-based, opportunities-focused environmental management model for just transitions in Aotearoa New Zealand is timely. It

- heeds the lessons of New Zealand's participatory decision-making experiments
- emphasises the sociality and place dependence of economic action
- highlights the importance of place-based policy
- dovetails closely with EBM
- builds on the value of participation and co-learning
- recognises Māori rights and interests
- embeds the three pillars of just transitions into routine management. It offers an alternative to each of these RMA axes of order.

The model helps to operationalise concern with community and economy in EBM. It offers an answer to how blue economy might be yoked to EBM in practice by directing the management focus to practice and to opportunities to enhance the utilisation of resources (the question at the core of the Sustainable Seas objective).

The model avoids putting trade-offs at the centre of EBM by reframing environment-economy relations in holistic terms. Environmental management and creating value in a blue economy are positioned as bound into a pivotal choice framing relation centred on the negotiation of priorities with respect to practice and opportunity rather than trade-offs framed by universalist approaches, interests at the national scale, and the analysis of distanced experts and expertise.

11.2.3. Indigenising blue economy

One crucial set of transitioning initiatives towards a blue economy is to proliferate the key principles and related practices of a Māori marine economy summarised in Section 8.4.5 and laid out in depth by Reid and colleagues (2019). Expanding Māori marine economy in each targeted sector and encouraging initiatives framed under its principles will ensure just transitions.

A more provocative transitional strategy is to abandon efforts to demarcate a Māori economy as one prominent element of a blue economy and seek to indigenise marine economy more generally. In these terms, Aotearoa New Zealand's challenge is to take a lead from Māori economy actors on how to operationalise kaitiakitanga and other Te Ao Māori values and principles in marine economy, resolve contradictions between principles and capitalist practices, rework the principles of EBM and just transitions in Māori terms, rework Figure 21 in these terms, and adopt new strategies and practices such that the entire blue economy is indigenised (Figure 22).

Figure 22 imagines that this will be an open and incremental process.

The opportunities-focused, place-oriented practice-based management model we propose above is consistent with Te Ao Māori, and available to be indigenised. Production practices and relations can be readily made consistent with Te Ao Māori, to the full extent that this is possible in Māori economy. The success of Māori seafood enterprises, for example, provides a firm foundation for proliferating and adopting these principles. Few of those with whom we talked contested the value and wider applicability of Māori economy principles across all forms of enterprise.

Figure 22: Blue Economy development model

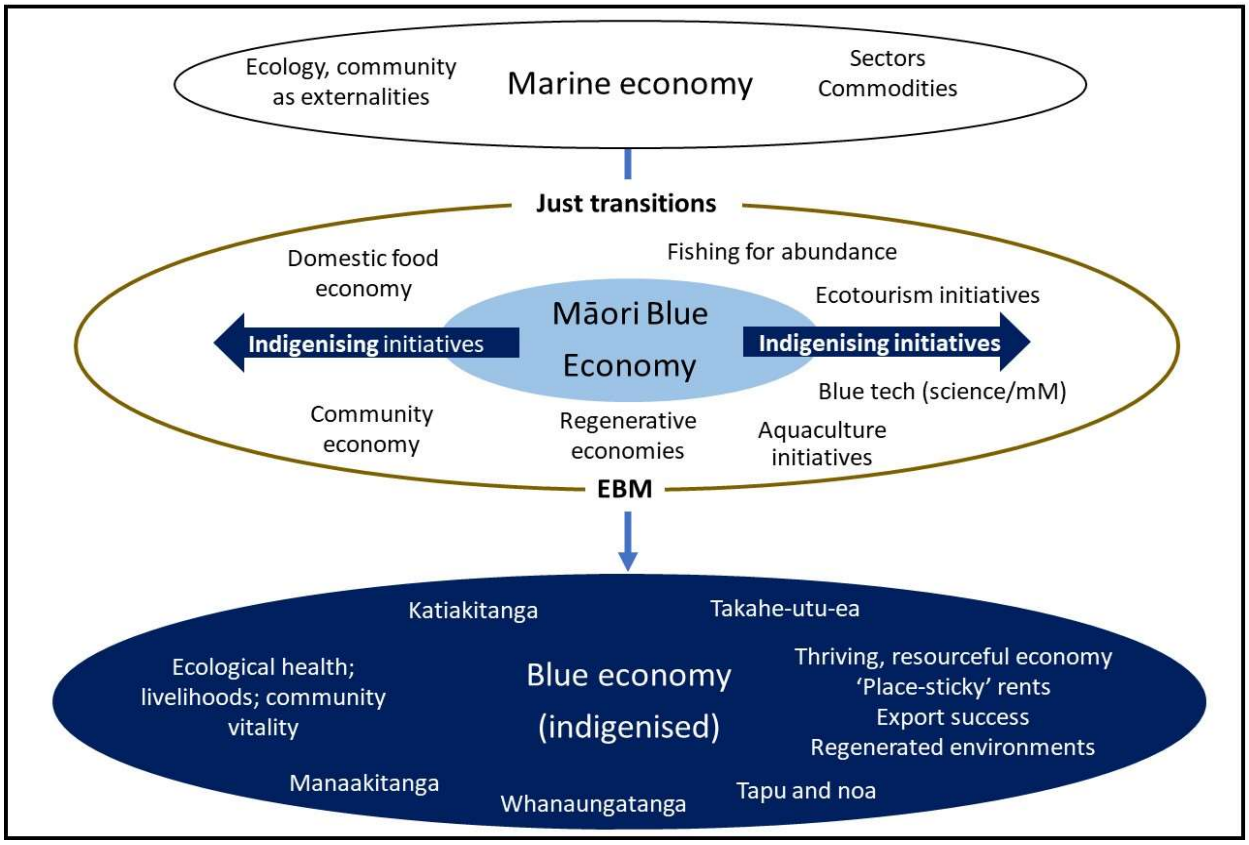


Figure 22 is our model of transitioning to a blue economy in Aotearoa New Zealand. It suggests that practices might be taken beyond the current extent of indigenisation along five axes.

- extending Māori economy principles across all forms of enterprise as a platform for environmental, community, and economic gains – via enthusiastic adoption by enterprises, promotion of demonstrating effects by champions, moral suasion, and/or incremental supportive regulatory change
- pursuing, researching and adopting mātauranga Māori technological developments along value chains, to indigenise practices, realise cultural, community and environmental commitments, add authenticity and credence values, and achieve productivity gains

- support for ensuring that all activities currently understood as falling within Māori marine economy live up to the principles outlined by Reid and colleagues (2019), including research and regulatory change
- indigenising institutions such as iwi-structured ownership of quota that are currently understood to restrict the authentic practice of indigenous economy
- developing indigenous verification, certification and branding exercises to bind all new Aotearoa New Zealand products and practices to indigenous principles.

Much of the challenge might be overcome by thinking in terms of returning geographical rent and management of environments to the communities and environments that generate via their distinctive resourcefulness. Elements of such 'returning' (or re-commoning) are already apparent in the aquaculture allocation to Māori, initial experiments with securing community mandates for development (Section 7.3.7), and experiments with participatory and co-governance arrangements (Appendix 1).

With Māori as kaitiaki and Treaty partners and often the dominant interests in marine economy regions, experimenting with solutions might begin by imagining a world in which all economic rent was returned to tangata whenua overseen by co-governance arrangements and a management framework such as Figure 21 repurposed for this brave new world.

That is, the QMS and the development of aquaculture, ecotourism, shipping, port, bioprospecting, and other uses of the commons might be revisited to ensure that rent is controlled and distributed by tangata whenua.

At the radical end of recommoning possibilities, the proposition to fully transfer 'ownership' of marine space and rights to tangata whenua (iwi and/or hapu) has much going for it. Indeed, experiments are already underway, and their success is visible in the operations of Wakatū, AgriSea and Whale Watch, who stand as champions of the blue economy.

It would impose a collectivity and place-stickiness on the appropriation of rents that is operationalisable, appropriate in Treaty terms, and aligned with Te Ao Māori environmental principles as a platform for framing EBM and securing blue economy based sustainable seas. It would provide a platform for EBM, a blue economy, and a place-based, opportunities-led management model. As a way forward, it is as compelling and equitable as any other model currently on the table.

It would need to be supported by co-governance arrangements and use rights that embrace wider community participation, address current non- Māori rights and interests, secure non-Māori participation, address access to external capital (foreign, non-Māori and non tangata whenua), and business connectivities (in science, production, distribution and supply chains). At this point, Figures 21 and 22 would need to be reworked.

Irrespective of how it is achieved or how far Aotearoa New Zealand dares to go, we see a blue economy as an indigenised economy, with all that entails for management and the control and distribution of resource rents. The Treaty is a unique resource globally for achieving a far more inclusive, more locally focused, and more ecologically oriented blue economy. Our time represents a wonderful opportunity to do something radical and to lead the world in just transitioning, albeit with significant details to work out.

With Māori economy so significant and expanding a part of New Zealand's marine economy and with Te Ao Māori commitments so closely aligned to conceptions of EBM and a blue economy, conceptualising transitions to a future blue economy for Aotearoa New Zealand *as indigenising a blue economy* presents a clear policy and management framework.

Indigenising contemporary practices and institutions and extending indigenous conceptions of a blue economy into wider economic management, business practice and production processes will present multiple foundational challenges (Reid et al 2019):

- recognising, addressing and institutionalising Māori rights and interests in any shifts in governance, conservation, and management regimes
- better aligning commercial and non-commercial interests across all BE activities, including balancing livelihood and environmental interests
- translating *kaitiakitanga*, *Whanaungatanga, Manaakitanga*, *takahe-utu-ea*, and *tapu* and *noa* more fully into existing and future commercial-scale activities
- embracing mātauranga Māori, including fuller use of locally-based Māori environmental information and understandings in managing economy-environment relations; identifying and investing in new technological opportunities (e.g. multi-trophic aquaculture and biodegradable fibres in nets and packaging); and adopting Māori institutions in the governance and management of the marine estate (e.g. legal personalities for ecosystems and species, mauri-centred management measures, and marae-centred management protocols)

Importantly, the case for an indigenised blue economy does not rely on claims that contemporary Māori marine economy is a fully developed model of what an indigenised blue economy might look like. Rather, the argument is that

- in practice Māori marine economy is engaged in re-commoning and customary and community economy, value-added approaches (both technology and provenance driven), a domestically focused supply economy, and a commodity economy governed by blue economy principles
- as Reid et al. (2019) foreshadow, there are a set of practical initiatives and interventions that might be developed to indigenise a national marine economy
- in principle and aspiration an indigenised marine economy offers us a model for a national blue economy

11.2.4. A national strategy for the Blue Economy and an Oceans Agency

Multiple interviewees noted that Aotearoa New Zealand does not have an overarching Oceans/Blue Economy Strategy or similar. Securing the set of national experiments or journeys we identify, will require the identification of specific pathways and leadership to secure them.

Experiments under the Labour–NZ First government of 2017-2020 included reinstating a special purpose agency (Fisheries New Zealand) and forming an informal cross-agency working party (Marine Hub). However, concerns with marine environments, the maritime conservation estate, and different economic sectors have yet to be assembled into a single policy regime or made the responsibility of a single implementation agency.

One of the consequences of the separation of aquaculture and fisheries from environment, conservation and community has been to privilege productivist resource economy. Other forms of economic activity outside of MPI's remit to encourage export-led growth primary production, such as tourism, education, blue technology, recreation, community food gathering and cultural economy, have escaped concerted policy attention.

There are shared cross-agency environmental concerns that demand attention. The Ministry for the Environment (MfE & Stats NZ, 2019) has called for greater understanding of the marine environment, its marine biodiversity, the benefits provided by marine ecosystems, and the economy-environment relations that shape marine environments and currently threaten native marine species, habitats and ecosystems. It suggests that current research effort is siloed and less well coordinated and coherent than it could (or should) be.

New Zealand is making slow progress in each of these regards. It has yet to develop ecosystem services accounting, leverage regenerative economy into ecosystem recovery and restoration, or formally adopt blue economy thinking into policy.

A full oceans strategy with an appropriate administrative and institutional structure would allow environment-economy relations to be considered directly as opposed to being understood as two antagonistic domains which are the preserves of different and entrenched interest groups. It would promote an emergent BE and help to align aquaculture, fisheries, recreational uses, and tourism with conservation and climate change.

As one of our interviewees put it unprompted – 'if all that were to come out of Sustainable Seas was a Ministry for the Oceans, then it would have done its job'. Another, whose material interest in marine spaces are fundamentally different, claimed it to be a 'travesty' that 'we don't already have one'.

Market Economics observe that it will be necessary to develop a knowledge base not only to manage the oceans in a way that is environmentally and socially sustainably in future, but to

address the “increasing conflicts over the use of this limited resource” (Yeoman, Fairgray, & Lin, 2019, p. 2).

This *will require a science strategy*, which will need to resource the fundamental science necessary to measure and monitor the health of Aotearoa’s oceans and coastal environments, track the use of ocean resources, and support a place-oriented, practice-based, opportunities-focused EBM regime. Such a strategy will need to be negotiated, continuously codeveloped, and supported by new knowledge. Sustainable Seas teaches us that it needs be interdisciplinary and cross-institutional siloes, make better use of international science as well as mātauranga Māori, and embrace and support economic innovation, broadly understood from regenerative initiatives to export success.

Blue economy thinking offers up a way of prioritising effort that centres the future health of the oceans and the coastal communities that depend upon them – as well as ensuring that the use of marine resources is enhanced for national benefit. National coordination through a Blue Economy policy and/or Oceans Ministry would help to identify knowledge gaps, settle on priorities, and focus effort. It would also help to curate and coordinate a blue economy future that serves Aotearoa New Zealand environments and communities and creates widespread blue economy. As global geopolitics becomes less stable and market opportunities shift, the environmental qualities of its land and ocean estates and the well-being of its communities become ever more important.

11.3. Targeted research to support blue economy transitions (Phase II research):

We end this report by directing attention to the four blue core projects funded for tranche II of the Challenge under the Blue Economy theme. In the context of the wider Sustainable Seas Challenge, we suggest that these projects will support the provocative ways forward outlined in the previous section.

At their cores lie crucial research for building an ecotourism economy, an EBM framed seaweed aquaculture, a platform for regenerative economy initiatives, and indigenising the marine economy. The Phase II projects will work with co-development partners to deliver crucial applied knowledge for just transitions to a blue economy.

The four core projects were co-developed with Māori and key stakeholders and build on research under the CVBE project. They define four pillars for blue economy futures in Aotearoa New Zealand (Figure 22):

- Ecotourism that integrates economic, amenity, cultural, ecological and community development values

- EBM framed aquaculture that is driven by a holistic redefinition of environment-economy relations
- Regenerative economy initiatives at multiple scales
- Indigenising blue economy with the concern of local peoples and environments at its core

These projects are supported by eight Innovation Fund projects (https://www.sustainableseaschallenge.co.nz/news-and-events/news/catching-the-wave-new-innovation-fund-projects-to-grow-our-blue-economy/). These projects develop a blue economy understanding of innovation and will launch blue economy initiatives across multiple sectors. Along with the core projects, they are designed to complement research conducted in other parts of the research and innovation landscape.

The Phase II research directions have all been worked out through workshop processes with iwi, research partners and multiple stakeholders and formalised through co-development processes. They indicate collectively held priorities that echo Figure 22, validate the findings of this Report, and support our recommendations. They are a significant measure of the impact of the research described in this Report.

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Appendix 1: Table of BE-based 'commoning' initiatives

Name	Location	Description
Sea Change/ Tai Timu Tai Pari	Hauraki Gulf	Established in 2013, the Sea Change process was led by a governance group representing a partnership between mana whenua and local and central government agencies, having equal membership. The Sea Change process led to the writing of the Hauraki Gulf Marine Spatial Plan by a Stakeholder Working Group comprising 14 members reflecting a diverse range of interests including mana whenua, environmental and conservation, commercial and recreational fishing, aquaculture, land use, farming and infrastructure. The Spatial Plan was produced in 2016. See https://www.seachange.org.nz. Information also available at https://gulfjournal.org.nz/.
Te Korowai	Kaikoura	The key achievement of Te Korowai is the special legislation passed in 2014 to protect Te Tai o Marokura - The Kaikōura (Te Tai o Marokura) Marine Management Act - resulting in the formal implementation of many of the tools outlined in the Kaikoura Marine Strategy of 2012. The group strives to be stewards for the marine environment. The website says: "We apply the philosophy of gifts and gains where each stakeholder gifts concessions to sustain the integrity of the whole resource for the future." See https://www.teamkorowai.org.nz/.
Fiordland (Te Moana O Atawhenua)	Fiordland	Fiordland Marine Guardians are responsible for managing and caring for Fiordland's marine environment. The group represents commercial and recreational fishers, tourism interests, recreational users, marine science, conservation, and the local community. Their approach is shaped by the ethics of environmental kaitiakitanga and stewardship. Ōraka-Aparima Rūnaka Inc is the mandated iwi kaitiaki for the Fiordland area. The group provides advice to government, make recommendations on management measures, promote information sharing, assess the impacts of activities or threats to the area, and help monitor the health of the marine environment. See https://www.fmg.org.nz/.
Integrated Kaipara Harbour Management Group	Kaipara Harbour	The Integrated Kaipara Harbour Management Group (IKHMG) was established in 2005 and its key purpose is to promote integrated management and inter-agency coordination and kaitiakitanga of the Kaipara Harbour and its catchment. Integrated management of the Kaipara harbour is a process of utilising both traditional Māori philosophy and western science philosophy to manage the Kaipara as a interdependent system. Management is cross-sectoral and activities are co-ordinated across all levels. Management, planning and research recognise that the catchment, harbour and coast are linked and achieves the common vision and longterm objectives for the Kaipara Harbour. See http://www.kaiparaharbour.net.nz/.
		Source: Adapted from Le Heron, E. 2019, Hikuroa et al. 2020

Appendix 2: Wild fish and aquaculture data

			Year ended 30 June															
		Units	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Wild capture	Export volume	tonnes	297,130	294,307	294,628	271,562	280,515	236,702	251,949	269,883	252,874	265,756	243,974	269,186	256,604	244,402	239,512	238,864
	Export revenue	$NZ millions	1,070	1,065	1,057	1,068	1,045	1,156	1,156	1,261	1,252	1,272	1,168	1,242	1,380	1,338	1,372	1,509
Aquaculture[1]	Export volume	tonnes	36,537	37,823	40,010	43,832	39,096	38,718	41,555	45,094	42,495	38,148	37,188	34,112	36,086	40,794	39,462	38,767
	Export revenue	$NZ millions	187	201	221	243	227	304	250	301	293	274	332	321	388	406	406	454

1 Aquaculture products include: mussels, salmon, and oysters.

Source: https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/situation-and-outlook-for-primary-industries-data/

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