National SCIENCE Challenges

SUSTAINABLE SEAS

Ko ngā moana whakauka

Indigenising the blue economy in Aotearoa: A literature review

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Report

This document was prepared by Matthew Rout, Jason Mika, John Reid, Jay Whitehead, Fiona Wiremu, Annemarie Gillies, Georgia McLellan, Corey Ruha for Ko Ngā Moana Whakauka Sustainable Seas National Science Challenge.

Ko Ngā Moana Whakauka Sustainable Seas National Science Challenge is committed to the appropriate protection, management and use of mātauranga Māori within its research, outputs and outcomes. This is expressed through the respect and integrity of our researchers, both Māori and non-Māori, and in our approach to ethics and the management of intellectual property. Where mātauranga Māori is sourced from historical repositories, we recognise the obligation to take all reasonable steps to ensure its protection and safeguard for future generations. We also acknowledge the findings of the Waitangi Tribunal in relation to *Ko Aotearoa Tēnei: A report into claims concerning New Zealand law and policy affecting Māori culture and identity* and are committed to working with Māori researchers and communities to refine our approach.

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About the Sustainable Seas National Science Challenge

Our vision is for Aotearoa New Zealand to have healthy marine ecosystems that provide value for all New Zealanders. We have 60+ research projects that bring together around 250 scientists, social scientists, economists, and experts in mātauranga Māori and policy from across Aotearoa New Zealand. We are one of 11 National Science Challenges, funded by the Ministry of Business, Innovation and Employment.

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Summary

The Sustainable Seas National Science Challenge project—Indigenising the blue economy—focusses on addressing barriers that prevent Māori using their marine resources in a more culturally relevant, economically impactful, and environmentally sustainable manner. During co-development with Māori stakeholders, three key constraints were identified limiting Māori from transitioning to a blue economy. The first is the fragmented regulatory and jurisdictional environment in which Māori operate. The second is the concentration of Māori investment in certain fisheries assets, along with adherence to conventional business models vulnerable to systemic shifts. The third constraint is structural limitations on Māori coastal communities realising economic opportunities in the marine economy.

From this analysis emerged the three themes of the indigenising the blue economy project:

Pāhekoheko (integration)—supporting Māori-led integrated planning

Auahatanga (differentiation)—kaitiaki centred products and business models

Whakatautika (balance)—creating opportunities for Māori in coastal communities

This literature review explores the three themes, focusing on both constraints and potential solutions. It identifies as many constraints as possible while detailing as many potential solutions that can be discussed with the key stakeholders in the research.

Pāhekoheko

The pāhekoheko section identifies both quota and jurisdictional fragmentation, discussing the role of the quota management system (QMS) and the specific rules around Māori quota as well as the impacts of legislation that governs the marine space, and the complex and numerous settlement structures Māori have. It then discusses a range of possible solutions including regulatory reform, collaborative and cooperative structures Māori enterprises could form, co-governance and co-management, and trading mechanisms such as quota markets, rollover allowances, and species quota exchanges.

Auahatanga

The auahatanga section outlines constraints to differentiation, including issues emerging out of the QMS such as wild capture limits and industry consolidation, the globalised commodity economy for fish, lack of collective tracing, assurance, branding, marketing, and cost barriers. Aquaculture specific constraints are also discussed including long-time scales, carrying capacities, high investment thresholds, social license, and regulatory hurdles. It then describes possible solutions, including cluster development; technological, structural, product, and procedural innovation; as well as aquaculture specific solutions, covering social license, on-shore and deep-sea aquaculture, and integrated multitrophic aquaculture.

Whakatautika

Finally, the whakatautika section explores the key constraints affecting balance, with a focus on tensions between mandated iwi organisations and communities, industry consolidation, the role of the QMS in abstracting the marine economy away from those who actually fish, skills and capacities of communities, and mismatches between community locations and productive fisheries. It then details potential solutions such as dedicating quota to specific communities, cluster development, decentralised development programmes run by iwi, cultural, social, and human capital development programmes centred on communities, cultural matching at a community scale, as well as marine diversification away from wild harvest toward aquaculture and marine tourism.

Glossary of terms

Word/phrase	Definition
ahi kā roa	long burning fires of occupation, continuous occupation of land
Aotearoa	New Zealand
auahatanga	differentiation, innovation, creativity
awa	river
hapū	subtribe, clan, group of extended families
hāpuku	fish species: polyprion oxygeneios, also known as groper
hoki	fish species: macruronus novaezelandiae
hui	meeting
iwi	tribe, made up of related hapū
kai moana	seafood
kaitiakitanga	the ethic of environmental guardianship
kanohi kit te kanohi	face to face meeting
kāpata kai	food source or food store
kaupapa	first principles, policy, agenda, programme
kaitiaki	custodian, guardian, steward
komiti	committee
kōura	crustacean; Paranephrops, freshwater crayfish
mahinga kai	both a food and the area from which food is harvested
mana	pride, prestige, power
mana whenua	territorial rights, also connection to and care of land
marae	communal and sacred meeting ground
marae komiti	a committee that runs a communal meeting ground
mātaitai	customary fishing reserve
mātauranga	knowledge
Mātauranga Māori	Māori knowledge
mātauranga-a-hapū	knowledge specific to a hapū
mātauranga-a-iwi	knowledge specific to an iwi
Māui	mythic Māori figure famous for many exploits
maunga	mountain

mauri	life force, source of vitality
moana	ocean
pāhekoheko	integration
papatipu rūnanga	sub rūnanga of Ngāi Tahu relating to hapū
pāua	abalone
pounamu	greenstone, jade
rangatiratanga	the ethic of good leadership
rohe	traditional hapū/iwi territory
rohe moana	traditional hapū/iwi ocean territory
rūnanga	tribal council
taiāpure	customary fishing area
Tangaroa	Atua (god) of the ocean
tāngata whenua	Māori, literally people of the land
tangi	Māori funeral ceremony
taonga	treasured possession or important species or resource
Tarakihi	fish species: nemadactylus, also known as jackass morwong or deep sea perch
te ao Māori	the Māori worldview
te mauri o ngā taonga katoa	mauri of all things
te Tiriti o Waitangi	the Treaty of Waitangi
teina	younger sibling or cousin of the same gender
tikanga	customary values and practices
tino rangatiratanga	self-determination, sovereignty or unqualified chieftainship
tīpuna	ancestor
tuakana	an older brother, sister or cousin of the same gender
waka	canoe, boat
waka taurua	a metaphorical framework for collaborative initiatives
whakapapa	genealogy
whakatautika	balance
whānau	extended family
whenua	land

Abbreviations

Abbreviation	Definition
ACE	Annual catch entitlement
AFL	Aotearoa Fisheries Limited
AHC	Asset holding company
AMA	Aquaculture management area
ASC	Aquaculture Stewardship Council
BLNZ	Beef+Lamb New Zealand
CRR	Circular, regenerative or resorative
DOC	Department of Conservation
EBM	Ecosystem-based management
EC	European Commission
EEZ	Exclusive Economic Zone
FTEs	Full-time equivalents
GDP	Gross domestic product
HMS	Highly migratory species
ICP	Iwi Collective Partnership
IMTA	Integrated Multitrophic Aquaculture
ITQ	Individual transferable quota
KDC	Kaikōura District Council
KUMA	Te Kupeka Umaka Māori ki Āraiteuru
LFR	Licensed fish receivers
MBIE	Ministry of Business, Innovation and Employment
MFAT	Ministry of Foreign Affairs and Trade
MfE	Ministry for the Environment
MOD	Ministry of Defence
MOJ	Ministry of Justice
MPI	Ministry for Primary Industries
MSC	Marine Stewardship Council
NIWA	National Institute of Water and Atmospheric Resarch
NPSG	Ngāti Porou Seafood Group
NSCC	Nelson Seafood Cluster Committee

NZ	New Zealand
NZKS	New Zealand king salmon
POSA	Post-settlement assets
PRESA	Pre-settlement assets
PSC	Prohibited species catch
PSH	Precision Seafood Harvesting
PVC	Polyvinyl Chloride
QMA	Quota management area
QMS	Quota management system
R&D	Research and development
RMA	Resource Management Act
S.H.	Southern Hemisphere
SET	Settlement quota
SIL	Seafood Innovations Ltd
SLO	Social license to operate
TAC	Total allowable catch
TACC	Total allowable commercial catch
TKT	Te Kawai Taumata
TOKM	Te Ohu Kaimoana/Treaty of Waitangi Fisheries Commission
TPWT	Te Pūtea Whakatupu Trust
TWMT	Te Wai Māori Trust
WTP	Willingness to pay
WWF	World Wildlife Fund
WWK	Whale Watch Kaikōura

Introduction

Ocean limits and constraints

For centuries, oceans have been viewed by the West as a near infinite resource to be exploited for human benefit. "Colonization of the islands across Oceania" McGinnis (2012, p. 18) explains, "was supported by a myth of an ocean as an expanding frontier with endless resources." In recent decades, however, many of the hard limits of the seas have been realised and reached. A particular wakeup call in Aotearoa New Zealand was the collapse of the orange roughy fishery in the 1990s. Tim Pankhurst (N.D., as cited in O'Connell, 2017, para. 4), chief executive of Seafood New Zealand explains how the "1980s saw a gold rush on the high seas and the fishery was so lucrative it bankrolled the development of the New Zealand seafood industry... So much roughy was being caught that vessels were sunk in the process." Even as Aotearoa New Zealand's fisheries have become more sustainable—including the orange roughy fishery, which gained Marine Stewardship Council certification in 2016—the wider tension between economic drivers and environmental needs remains across the Aotearoa New Zealand marine space. Urgent changes are needed, changes that go above and beyond 'simple' operational changes to the way we fish, process, and sell marine products. Rather, these changes need to occur in the way we understand natural resources and the way we view the economic exchanges that see them extracted and exported around the world. This is where the Sustainable Seas National Science Challenge (Sustainable Seas) comes in.

Sustainable Seas National Science Challenge

The Challenge was established to work out how we enhance the use of Aotearoa New Zealand's marine resources within environmental and biological constraints (Sustainable Seas National Science Challenge, 2023). The need for a fundamental step change in the 'marine economy' is of critical and pressing importance. "At every level of the food web", McGinnis (2012, p. 30) explains, "there is evidence of dramatic decline in the general health of marine ecosystems." In their highly influential article, 'Impacts of biodiversity loss on ocean ecosystem services', Worm et al. (2006) predict that the oceans will be functionally dead by 2048. Yet, even the title of their article reveals the very framing of the ocean that has led to this crisis. This language, of 'services' that ecosystems can provide to humans, portrays oceans as having a solely instrumental value, as a resource to be used. The concept of "[e]cosystem services have now become the central metaphor within which to express humanity's need for the rest of living nature" (Redford and Adams, 2009, p. 785). As Sullivan (2015, para. 9) argues, the "particular language of... 'ecosystem services' affects how we understand and relate with the multiple selves of 'the natural environment'." This gets to the heart of the changes required for a real 'blue economy', not just taking slightly less fish but actually changing the way we relate to and think about the oceans and their inhabitants.

The concept of the 'blue economy' has been gaining traction as species extinctions, population collapses, and ecosystem declines across the world's oceans have made the plight of the seas impossible to ignore. A 'blue economy' is one where marine activities create economic value and contribute positively to social, cultural and ecological well-being. The vision of the challenge is that Aotearoa New Zealand has healthy marine ecosystems that provide value for every New Zealander. Along with ecosystem-based management (EBM),

creating a blue economy across Aotearoa New Zealand's marine space is a key pillar in achieving the Challenge vision.

The goal of the indigenising the blue economy research is to partner with Māori authorities (iwi and pan-iwi entities and Māori enterprises) to explore and support Māori who aspire to a blue economy imbued with mātauranga, treaty principles, and a focus on Māori wellbeing, human potential and relational balance with Tangaroa as our tīpuna. The blue economy concept has a strong alignment with both traditional and contemporary Māori economic approaches. However, while many Māori operating in the marine space can be seen enacting blue economy elements, roadblocks still remain for the holistic manifestation of the blue economy across Tangaroa. Indigenising the blue economy requires, in part at least, the wider marine economy and its supporting institutions to be indigenised as per the aspiration for this research above.

During engagement with stakeholders on this research, Māori enterprises identified three key constraints affecting them from transitioning to a restorative blue economy. The first is the fragmented regulatory and jurisdictional environment in which Māori operate, including quota fragmentation and concerns about the quota management system (QMS), marine regulations, and marine jurisdictions. This inhibits long-term integrated economic planning. The second constraint is the concentration of Māori investment in certain fisheries assets, along with adherence to conventional business models that are vulnerable to systemic shifts (for example, from climate change, or changes in consumer preferences). This prevents the ability to add value and to minimise risk. The third constraint is structural limitations on Māori coastal communities realising economic opportunities in the marine economy. This restricts Māori from engaging with Tangaroa and effectively utilising settlement quota.

The research explores processes, structures, technologies, and policies across three themes designed to address these constraints: first, pāhekoheko (integration)—supporting Māori-led, multi-generation, integrated planning across economic sectors in their marine jurisdictions to maintain te mauri o ngā taonga katoa (the mauri of all things) and enhance the efficiency of asset holding and resource utilisation; second, auahatanga (differentiation)—differentiating kaitiaki generated products from commodities and diversifying Māori activity in the marine economy; and third, whakatautika (balance)—creating employment, enterprise, and other economic opportunities for whānau and hapū in coastal communities, leveraging the assets of iwi and pan-iwi authorities.

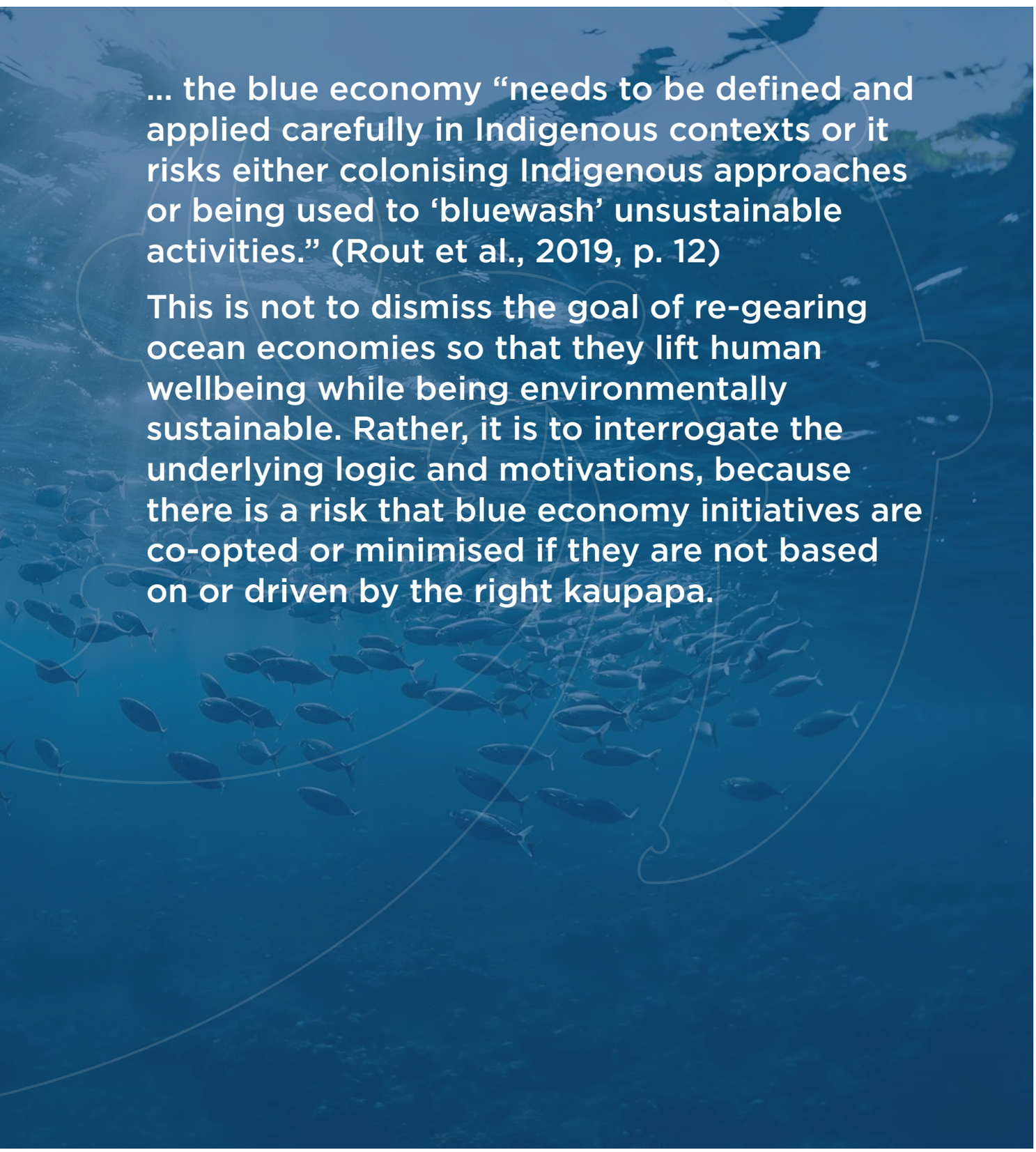
This literature review explores the three themes, focusing on constraints and solutions. That said, while constraints are relatively comprehensive, solutions provide only a broad sketch. There are two reasons for this. The first is that there are more possible solutions than constraints and a thorough overview of all solutions would be too extensive. The second is that part of the programme's mandate is to work with Māori authorities to develop these solutions. This literature review is a scoping mechanism that will seek to provide a rough outline of solutions to ensure freedom of direction in the next stages of the programme.

Before examining the three themes, however, we provide a brief consideration of 'blue economy' as well as an overview of 'indigenising' the blue economy. This highlights some foundational issues.

Māori Marine Economy

The two goals of the Sustainable Seas National Science Challenge are: (1) improving marine resource decision-making and the health of our seas through EBM; and (2) transforming Aotearoa New Zealand's ability to enhance our marine economy into a blue economy. Phase 1 of this project focused on defining and mapping the Māori marine economy (Rout et al., 2019). The results of the Phase 1 project on the Māori marine economy have been summarised (Mika et al., 2022). That project largely focused on the first goal, but briefly explored both the general concept of the 'blue economy', as well as how this might be 'indigenised'.

Here it is noted that the blue economy concept is ambiguous in its definitional scope, while some view it as "the use of the sea and its resources for sustainable economic development" for others blue economy "simply refers to any economic activity in the maritime sector, whether sustainable or not" (World Wildlife Fund [WWF], 2018, p. 2). The blue economy concept has been criticised as being grounded "in the logics of capitalist growth rather than in recognition of its contradictions and inequalities" (Silver et al., 2015, p. 138). Rout et al. (2019, p. 12) have also noted that the blue economy "needs to be defined and applied carefully in Indigenous contexts or it risks either colonising Indigenous approaches or being used to 'bluewash' unsustainable activities." This is not to dismiss the goal of regearing ocean economies so that they lift human wellbeing while being environmentally sustainable. Rather, it is to interrogate the underlying



... the blue economy "needs to be defined and applied carefully in Indigenous contexts or it risks either colonising Indigenous approaches or being used to 'bluewash' unsustainable activities." (Rout et al., 2019, p. 12)

This is not to dismiss the goal of re-gearing ocean economies so that they lift human wellbeing while being environmentally sustainable. Rather, it is to interrogate the underlying logic and motivations, because there is a risk that blue economy initiatives are co-opted or minimised if they are not based on or driven by the right kaupapa.

logic and motivations, because there is a risk that blue economy initiatives are co-opted or minimised if they are not based on or driven by the right kaupapa. This section will briefly define the blue economy and how the challenge understands it, then expand on the criticisms of the concept, before outlining further how the blue economy concept might be indigenised and how this connects with Phase 2 of the project.

Since it was coined in 2010 by 'serial entrepreneur' Gunter Pauli (Bargh, 2014)—riffing on the recently minted and highly influential 'green economy' term—the term 'blue economy' has been stretched to cover diverse and disparate terrains. At the most basic, the term is often used to denote a 'sustainable' approach to the marine economy, though in some cases it has even had the 'blue-green' element removed. At its most diluted, flensed of any reference to the environment or wellbeing, the European Commission [EC] (2019, p. 6) uses the term 'blue economy' to refer to "all economic activities related to oceans, seas and coasts." When the EC does refer to environmental factors, oceans are framed as 'natural capital', for example, "the healthier [seas and oceans] are, the more productive they'll be." These minimalist econometric definitions are relatively uncommon, though their existence is important as they provide what might be seen as the 'business as usual' approach.

Defining the blue economy

Generally speaking, the blue economy has three interrelated components. Alongside the economic are both environmental and social pillars. "Most definitions", Voyer et al. (2018, p. 598) explain, "include a focus on 'triple bottom line objectives' of environmental sustainability, economic growth and social equity, driven by an integrated oceans governance approach and technological innovation." As Bennett et al. (2019, p. 991) explain, many of the small island developing states "were among the first to advocate for attention to the blue economy, which, in their vision, features social equity and environmental sustainability as core tenets." Within these triple bottom line definitions there is a lot of variation. The World Bank (2017, as cited in Abhinav et al., 2020, p. 1) defines it as the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem." Here, while all three pillars are referenced, the focus on 'economic growth' while 'preserving' the health of the ocean ecosystem suggests this version of the blue economy is more aligned to 'business as usual' but with some reduced environmental impacts and improved livelihoods. The WWF provides a more detailed definition that provides explicit strategies and solutions. A sustainable blue economy is a marine-based economy that:

- Provides social and economic benefits for current and future generations, by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, and political stability
- Restores, protects and maintains the diversity, productivity, resilience, core

functions, and intrinsic value of marine ecosystems—the natural capital upon which its prosperity depends

- Is based on clean technologies, renewable energy, and circular material flows to secure economic and social stability over time, while keeping within the limits of one planet (WWF, 2018, p. 4).

Here, the 'economic' elements include a circular approach, while the oceans are acknowledged as having an intrinsic worth. In contrast to the World Bank, this definition has a more maximalist focus on the environmental outcomes.

The Economist (2015, as cited in Smith-Godfrey, 2016, p. 59) provides a definition that lies between the European Commission's singular focus on economics and those triple bottom line demarcations: "A sustainable ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy." The focus on economy and environment is the most obvious pairing, with social wellbeing or equity the 'last cab off the rank' when it comes to mapping the semantic parameters of the concept.

The Sustainable Seas (2019, p. 3) definition has a triple bottom line approach: "marine activities that generate economic value and contribute positively to social, cultural and ecological well-being." The triple bottom line approach with some variations of inflection and emphasis appears to be the most common definition though there are no quantitative studies that back this up.

Criticism of blue economy

There are a number of criticisms of the blue economy concept, many of these can be mapped along a spectrum. At the weaker end of the spectrum, it has been criticised for being ambiguous, contradictory and even 'imagined', generally because it is a complex and amorphous concept that numerous stakeholders with different perspectives and positions have defined differently. At the more extreme end, the criticisms portray this ambiguity as being a feature rather than a bug, a feature that enables the 'blue economy' concept to act as a trojan for dominant capitalist actors and structures.

"The concept of the Blue Economy", Cisneros-Montemayor (2019, p. 395) simply notes, "is increasingly in use but under different, sometimes contradictory, definitions." "Terms such as the Blue Economy can be understood to be 'buzz words'", Voyer et al. (2018, p. 598) detail, "which 'represent a general agreement in the abstract but they generate endless (and irresolvable) disagreements about what they might mean in practice'." Carver (2020, p. 132) explains how the interpretational vagueness translates to implementation: "[T]he ambiguity of a global definition for the blue economy has resulted in disparate conceptualisations at a local level. This affects how the blue economy is enforced and institutionalised into policy and can result in an uneven articulation of the agenda." Keen et al. (2018, p. 333) make the same criticism, also noting this lack of precision impacts implementation:

> The Blue Economy concept is increasingly being invoked, yet clarity on definitions and implementation steps remain vague… Despite the Blue Economy concept being increasingly invoked as an ideal, it is not well conceptualized with an explicit mapping of its key components, and hence its utility to date has been more conceptual or political, than practical.

Winder and Le Heron (2017, p. 14) begin to unpick more of the metaphorical aspects while also noting the conflicted nature of the concept, explaining that "the Blue Economy in its manifold forms of imagining is compartmentalized, unsystematic and even contradictory in intent and organisation." Childs and Hicks (2019) provide both metaphorical elements and also note how the vagueness has a degree of utility. In terms of the concept's abstract nature, they (Childs & Hicks, 2019, p. 325) discuss how the "blue economy is imagined", refer to the "blue economy narrative", and note that "understanding the blue economy… is important not only in a policy driven sense, but also in metaphorical terms." Childs and Hicks (2019, p. 324) believe that the "diversity [of definitions] engenders a vagueness that enables the blue economy to encompass divergent visions and ideologies; but, to also represent differing and conflicting agendas."

In some ways, as Childs and Hicks discuss, having a relatively 'broad church' concept is useful as it provides scope for diverse stakeholders to ascribe to a similar vision whilst also providing flexibility to take varying approaches. However, the problem with having a concept that has such real world potential in terms of profit and power, yet is vague, conflicted, and even imagined in its definitional parameters is that this leaves the door open for bad faith actors to use or manipulate the blue economy for their own ends. This is something Childs and Hicks (2019, p. 324) identify:

> Such a turn towards 'critical ocean studies' within social thought across the world has sought to foreground the unique ontological and postcolonial provocations wrought by the sea. These welcome efforts to bring the ocean into political view have aimed, on the one hand, to decolonize its epistemologies and ontologies… On the other hand, they have tried to spatially recalibrate the ocean away from a flat and inert space towards a vibrant, dynamic and voluminous one. However, even in the face of this scholarly work, capital has continued to prove adept at capturing and reducing oceanic diversity into an economic object of potential through the simple and colorful epithet: 'blue.'

At Rio 20+ in 2012, Silver et al. (2015, p. 135) tracked the emergence and spread of the term, identifying four 'competing' discourses: "(a) oceans as natural capital, (b) oceans as good business, (c) oceans as integral to Pacific Small Island Developing States, and (d) oceans as small-scale fisheries livelihoods." While they (Silver et al., 2015, p. 139) were concerned that its appearance meant "ocean spaces and resources [were] being discursively enrolled within the broader green economy agenda and in particular, neoliberal, ideals [were] ascending within global oceans governance", they found that in some instances "articulations diverged altogether from the 'nature-as-capital' ontology." At this early stage in the blue economy's trajectory, Silver et al.

(paraphrased in Mallin & Barbesgaard, 2020, p. 124) felt the concept "assumed a flexible function, fulfilling both ideological and technical interests of different 'governance actors'." Sceptical of this 'flexibility', Mallin and Barbesgaard (2020, p. 124) note how the 'precariousness of discourse' Silver et al. identify, "supposedly presented possibilities for marginalised actors." However, as they (Mallin & Barbesgaard, 2020, p. 129) conclude, what they call the 'blue economy paradigm' "appears to command a return to hierarchy: minimising spatial rivalry, creating stable environments for the circulation of fixed capital, and allowing industrial production to expand in a relatively calm sea."

This takes us to the far end of the spectrum, where the 'blue economy' concept is either intentionally or incidentally used as a proxy or front for dominant capitalist actors and structures to continue and increase their domination of ocean spaces. Following the first high-level conference on the 'Sustainable Blue Economy' Pavan Sukhdev (2018, para. 2), President of WWF International, opined:

> Humankind has historically pursued and achieved economic progress by exploiting frontiers, moving to the next frontier once the former is exploited. However, to be "sustainable", the blue economy needs a model quite different from our dominant economic model: a 'take-make-dispose' economy that converts public wealth into private profits, leaving in its wake a trail of devastation: distributional inequity, environmental externalities, and depleted resources for future generations. Thus, the central challenge for senior policymakers and business leaders travelling home from Nairobi is to provide a clear steer to prevent the ocean from being treated as the next new frontier for conventional capitalism since we have already exploited all previous ones.

While certainly not a consensus, some critics do see the 'blue economy' used as a smokescreen for 'bluewashing'. This can be seen in the triple bottom line definitions, which appear to give balance between economic, environmental, and social factors – whilst also "creat[ing] an appealing sense of progressive change" (Schutter et al., 2021, p. 6). However, the use of 'economic growth' in particular, along with 'integrated oceans governance' and 'technological innovation', in some definitions shows how easily an imbalance between the three pillars can be created. Schutter et al. (2021, p. 2) argue that the "blue economy can be seen as a new iteration of the passive revolution facilitated by the green economy, in which the hegemony of capitalism is further embedded into oceans." The blue economy, they continue, has "been argued to further promote a profit and growth paradigm, obstructing the fundamental change required to achieve actual sustainability" (Schutter et al., 2021, p. 2). Under the banner of the 'blue economy', Mallin and Barbesgaard (2020, p. 121) exclaim, "the world has borne witness to the inception of a far reaching reorganisation and expansion of capitalist value relations across the global oceans in recent years." These are extreme critiques, but the concern is that the 'blue economy' is being sinisterly manipulated: that it is just 'business as usual' with a sustainable and equitable sheen.

Much of this fear emerges from the bombastic non-zero sum pitch with which it is often 'sold'. The blue economy concept, Schutter et al. (2021, p. 1) argue, is based on an "optimistic belief in growing the economy and protecting the environment simultaneously, which has been argued to obscure trade-offs in favour of supposed win-win outcomes." Likewise, Andriamahefazafy et al. (2020, p. 75) identify "the paradox behind the idea of the blue economy, where economic growth and sustainable use of resources are promoted as jointly achievable." Mallin and Barbesgaard (2020, p. 121) make a similar point: "for many of its proponents, blue economies seem to exemplify triple win schemes, where (i) the wants and needs of coastal and island populations can be reconciled with (ii) cosmopolitan concerns for 'ocean health' and (iii) the capitalist growth axiom all at once." It is a solution in which "economic growth and environmental protection can go hand-in-hand through incorporation of environmental issues into markets" (Schutter et al., 2021, p. 2).

Underpinning this apparent capacity for continued growth without environmental consequences are new technological developments and integrated forms of governance. The promise of new technologies provides the optimism that growth can continue in parallel with reduced environmental impacts. Schutter et al. (2021, p. 2) explain how "the emergence of the blue economy has been observed to facilitate continued capital accumulation by offering technology and innovation as a way out of frictions and conflicting interests caused by the territorialisation process of the United Nations Convention on the Law of the Sea." Integrated governance works more as a lure, a way for vested interests to accumulate as much oceanic resources as possible – it is the next iteration in the "long historical lineage of capitalist modes of enclosing, appropriating, carving up and commercialising the seas" (Mallin & Barbesgaard, 2020, p. 122). Fache (2021, p. 68) notes that the "discursive (and somewhat oxymoronic) devices such as "blue economy" or "green capitalism" obfuscate the issue and strive to blur the boundary between grabbing [dispossession or appropriation of use, control or access] and communing [a commons based on the resource, a community, and a bundle of rights and duties]." "Behind the exclusive gatherings of transnational financial and corporate elites," Mallin and Barbesgaard (2020, p. 122) state, "lurks the suspicion that here a large bluewashing project is in the making, which ultimately provides a convenient mask for a 'sanitized ocean grab'."

The issues above are universal in their potential impact. Māori and other Indigenous groups not only face the possibility of a 'bluewash' and the potential loss of authority and influence over the oceans but also recolonisation through the imposition of western market-centric thinking. As a largely 'capitalist' paradigm, the blue economy threatens to replace the regrowing connections and control Indigenous actors have with their marine spaces. Bargh (2014, p. 467) is concerned that the blue economy concept "comes from a particular cultural genealogy." As McCormack (2018, p. 280)

warns: "[This] overt future orientation displaces historical practices and traditional knowledge. Arguably, the blue economy accentuates the centuries-long process of enclosures in the world's fisheries by identifying a new wave of 'growth opportunities' in marine and coastal ecosystems."

Indigenising the blue economy

This issue was discussed by Rout et al. (2019) in their literature review for Phase 1 of the Sustainable Seas Challenge. As outlined, to be Indigenous, a blue economy:

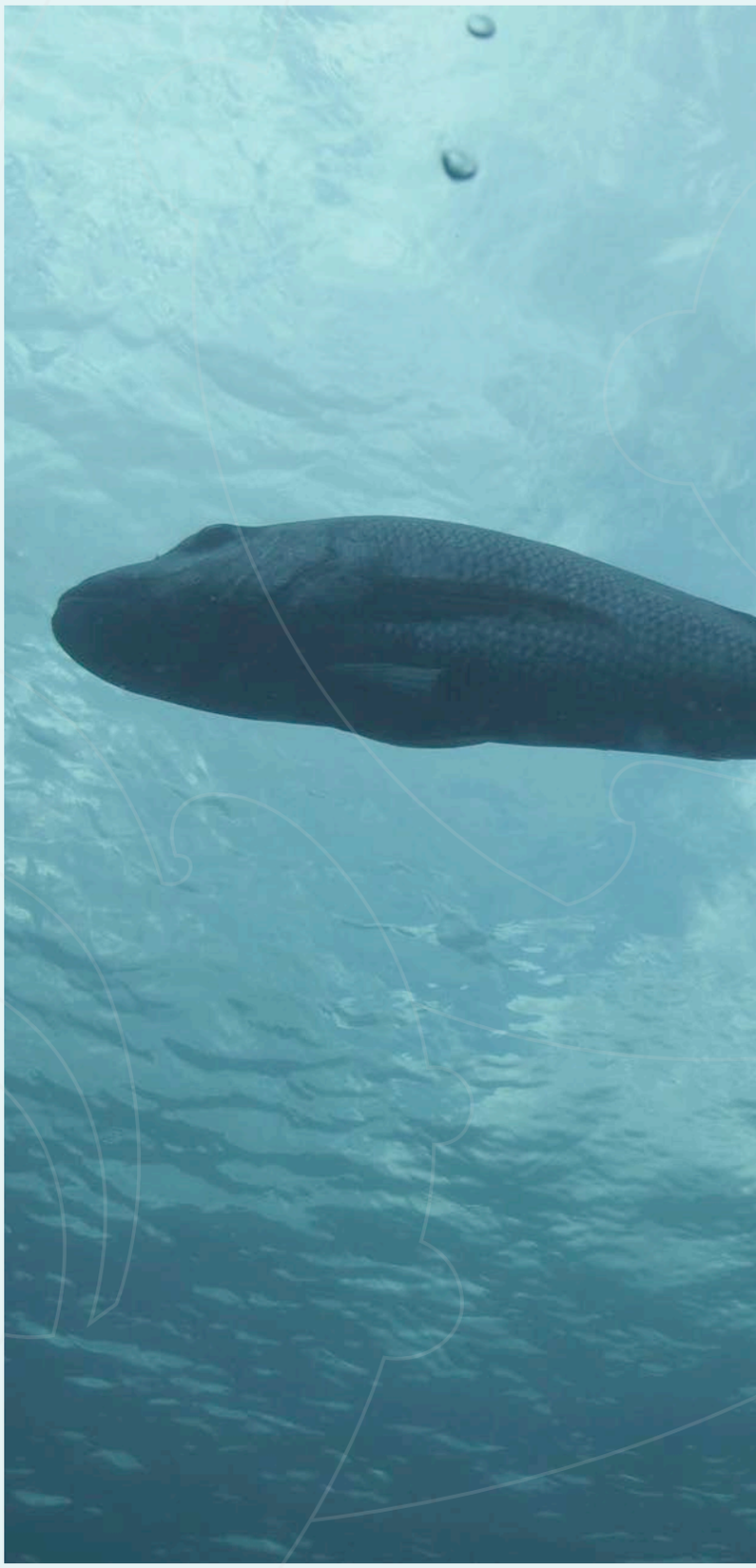
"[R]equires both a vital expansion, in that it must consider not just financial and natural 'capital' but also human 'capital' (here referring to what is often labelled as human, social and/or cultural capital in different text), and a critical reorientation, in that it must position all three of these in dynamic, nested exchange rather than the human and natural in service to the economic" (Rout et al., 2019, pp. 12-13).

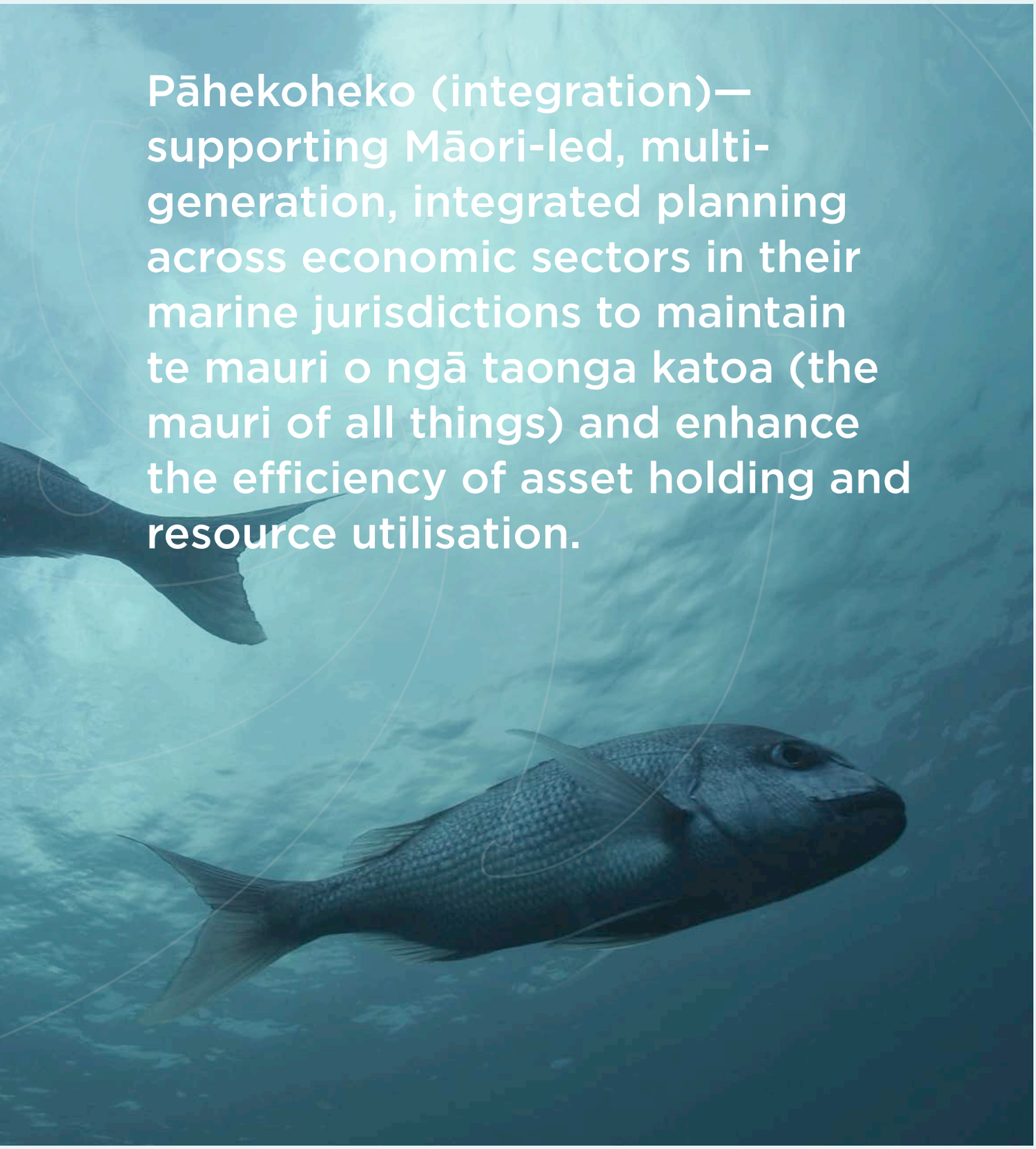
This is because, for Māori, "an economy is not only completely inseparable from their wider society, it should also be subservient to their society's values, beliefs, and goals" (Rout et al., 2019, p. 13). The alignment between the three capitals and four well-beings is then noted: "with economic well-being premised on financial capital, environmental well-being on natural capital and spiritual and kinship well-being on social capital." "For it to be Indigenous," it is finally noted (Rout et al., 2019, pp. 13–14), the concept of the blue economy needs to "re-embed exchange and the flows of financial capital into the wider human and natural contexts in which the economy occurs, and it must also account for flows of human and natural capital." While these are good initial starting points, there also several other critical areas that need to be explored:

- Deeper insights into blue economy structures and functions
- Analysis and incorporation of te ao Māori and mātauranga Māori within the blue economy structure and function
- Alignments with wider Māori, wellbeing, circular/regenerative economic thought and practice
- Integration/interface with wider marine, national, and international brown/blue economies
- Identification of areas where an Indigenous blue economy would provide advantages and disadvantages including potential enablers and constraints within the wider legal framework
- Mapping out the stages or steps to implementing an indigenised blue economy

1. Pāhekoheko—Integration

The Māori marine economy is constrained by several forms of fragmentation. This research theme aims to examine and implement solutions to problems such as quota, regulatory, and jurisdictional fragmentation within the Māori marine economy. These solutions will seek to address issues including market inefficiencies, provide tools to help negotiate regulatory and jurisdictional barriers, and support multi-generational integrative economic planning for the establishment of a restorative and indigenised marine economy. There are two key desired outcomes from this theme: determining how Māori can lead multi-generational, integrated planning across economic sectors and their marine jurisdictions to maintain the mauri of the moana; and finding ways of increasing the efficiency of quota distribution across iwi to grow scale and support sustainable fisheries management.




Pāhekoheko (integration)—supporting Māori-led, multi-generation, integrated planning across economic sectors in their marine jurisdictions to maintain te mauri o ngā taonga katoa (the mauri of all things) and enhance the efficiency of asset holding and resource utilisation.

1.1 Challenges

Quota fragmentation

The story of the introduction of the quota management system (QMS) and how it catalysed a serious and sustained response from Māori that resulted in significant quota and assets in the fishing sector offered in settlement has been told many times (Bargh, 2016; Boast, 1999; Bodwitch, 2017; De Alessi, 2012; Meijl, 2006; Memon and Cullen, 1994; Memon and Kirk, 2011; McCormack, 2018; Webster, 2002). The long and drawn out negotiations between Māori and the Crown, as well as the numerous adjustments to the QMS itself in the decades since it was first established, have created a highly complex regulatory ecosystem, one that is exceedingly complicated for all fishers to operate within and even more so for Māori (Rout et al., 2019; Torkington, 2016). Issues with the QMS will be examined across all three themes, so before examining the specific Māori issues of fragmentation caused by the system, a brief outline of the QMS and its regulatory issues is useful.

Quota Management System

The QMS, and the individual transferable quota (ITQ) that lies at the heart of it, was introduced in 1986, ostensibly as a response to the dramatic drop in several fish stocks. Even the very concept of the ITQ is fragmentary. McCormack (2021, p. 202) explains how ITQ "deconstruct nature by slicing up fishing rights into competing units of transferable property." Promoted as a sustainable alternative to the previous 'free-for-all fishing', the QMS was really the product of both an opportunity and an ideology aligning (Webster, 2002). The opportunity was the new ability to declare an Exclusive Economic Zone (EEZ) around the country, which Aotearoa New Zealand did in 1977. The "EEZ enclosure was really about who would extract valuable resources such as oil and minerals, as well as fisheries, rather than protecting them from depletion" (De Alessi, 2012, p. 398). Several years after the EEZ was declared, the Fourth Labour Government came to power, bringing with it a cohort of neoliberal ideologues set on restructuring Aotearoa New Zealand's entire institutional framework. The QMS was "designed and introduced as only one set of reforms among many other neoliberal initiatives" (Winder, 2018, p. 78). It is a system that is based on market logic, where the free hand is seen to be the ultimate guide (Torkington, 2016). The QMS "was controversial since it transformed traditional common use-rights in fish into privately owned, divisible commodities" (Meijl, 2006, p. 175). The transfer of fishing from a common good to a private right was the primary aim of the QMS even though it was "cloaked in the language of conservation" (Rout et al., 2019, p. 30). This transition to the QMS, McCormack (2017, pp. 37-38) explains, "explicitly linked [the] environmental and economic and trumpeted the QMS as the new panacea." Certainly, the belief was that the "privatised nature of the quota right will incentivise fishers fishing in less efficient operations, or those defined as making less income, to sell their way out of the fishery" (Rout et al., 2019, p. 30). The venerated perfection of 'the market' was supposed to solve all the environmental issues whilst

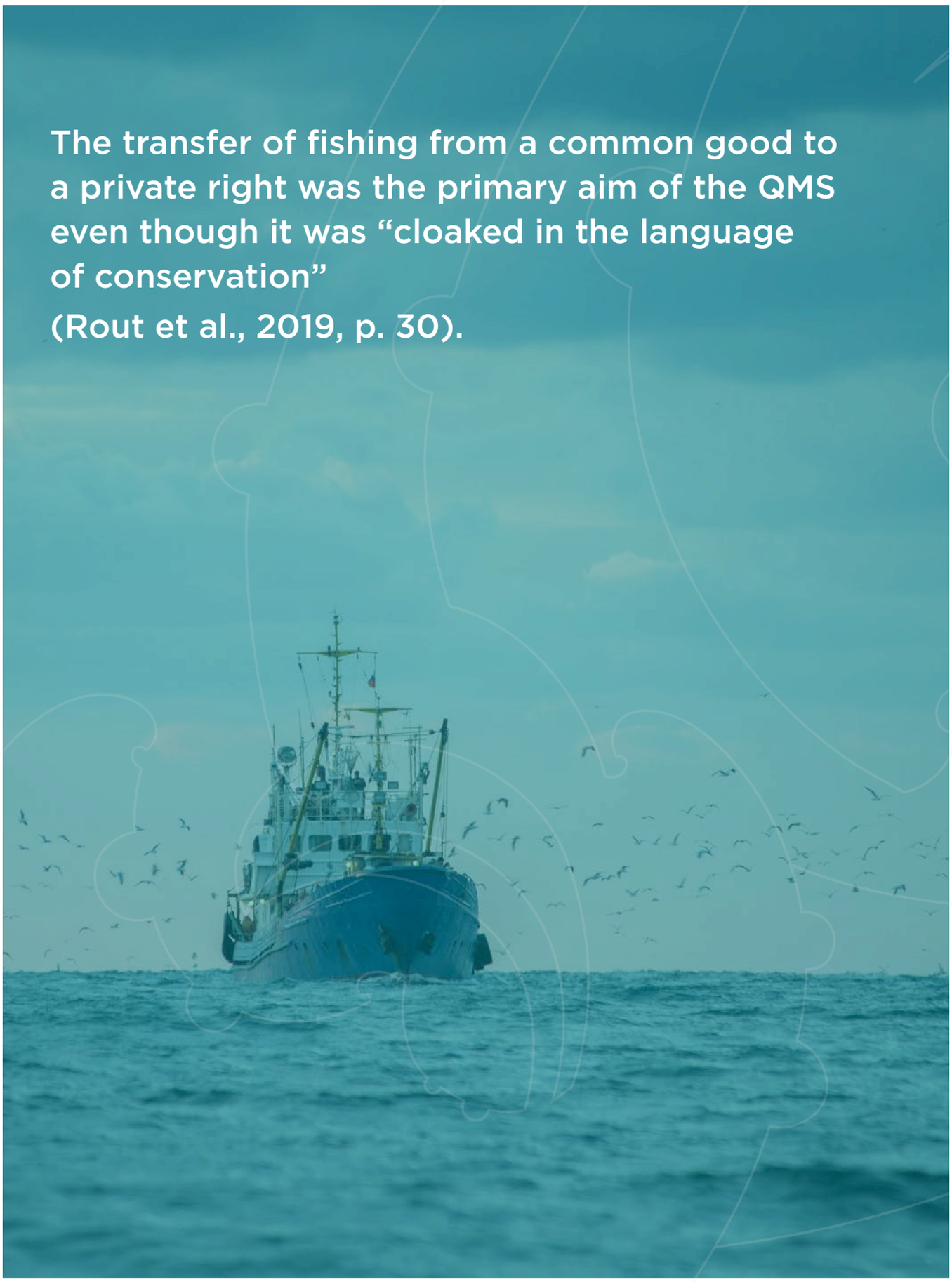
also incentivising profit for a select few. The QMS has been adapted many times since its inception. However, "the basic tenets of the system—setting a total allowable catch and leaving the market to determine the most profitable allocation of fishing effort—have remained intact" (Kerr et al., 2004, p. 2). The current settings of the QMS include (Simmons et al., 2017; Song et al., 2018):

- 98 species (or species groups)
- These species are divided into 642 separate fish stocks
- Each fish stock has a quota management area (QMA)
- Every fish stock has 100 million ITQ class shares
- There are limits on how much quota people can own, called 'aggregation limits', which can be placed on a whole species or on an individual stock
- Quota owning/leasing corresponds to a fixed right to a percentage of the 100 million registered quota shares for each fishery each year
- Annual Catch Entitlement (ACE) is the specific tonnage a quota right corresponds to per annum
- The amount of ACE that a quota owner receives depends on how much quota they own and the total allowable commercial catch (TACC) for that fish stock in that fishing year
- TACC is itself a component of the total allowable catch (TAC), which includes recreational and Māori customary fishing
- TAC is set via an assessment process incorporating biological data and fisheries information, where available
- If fishers do not have enough ACE to cover their catch, they must either buy more or pay a penalty to the government.
- Both ITQ and ACE can be bought, sold, or leased
- For some fish stocks, you need a minimum holding of ACE to catch them
- ACE can be traded
- Fish can only be sold to a Licensed Fish Receiver, enabling the government to better monitor numbers and species of fish caught in different QMAs
- There are regular reporting requirements for fishers and Licensed Fish Receivers
- Fishers must provide fish catch, non-fish species or protected fish species, disposal, processing, and landing reports, and monthly harvest returns
- Licensed Fish Receivers must supply amounts and types of fish received in the previous month and fishers that supplied the fish to them.

A number of works note how the 'world famous' QMS has long been held up nationally and internationally as the paragon of fisheries management systems (Hersoug, 2018; Libecap et al., 2020; Torkington, 2016; Winder, 2018). McCormack (2017, p. 35) explains that "[i]n popular imagination New Zealand fisheries represent a globally recognised story of a successful sustainable management regime, an indicator of national ingenuity and a 'clean green' environmental ethos."

At a celebration of the system's thirtieth anniversary then Prime Minister John Key

The transfer of fishing from a common good to a private right was the primary aim of the QMS even though it was “cloaked in the language of conservation”
(Rout et al., 2019, p. 30).



(2016, as cited in Hersoug, 2018, p. 101), exclaimed that "[b]y any definition, we can look back at the QMS and say it's been an overwhelming success." Voices of dissent have become increasingly loud in the last decade or so, particularly as numerous tweaks and additions have added complexity, with a range of criticisms levelled at the system (Hersoug, 2018; Libecap et al., 2020; Torkington, 2016; Winder, 2018).

Winder (2018, p. 78) believes the QMS "has been a unique fisheries experiment and, despite promising results in the short term, one that has not performed to initial expectations in the longer term." As Winder (2018, p. 78) goes on to explain:

> [T]he QMS/ITQ regime has been augmented by more and more management practices – place-based controls on fishing, planning for environmental effects, and marine protected areas – that hark back to practices in place when QMS/ITQ was introduced but which were thought to be unimportant at that time. Indeed, these new practices are themselves partly the result of critiques of QMS/ITQ from marine ecosystem science and New Zealand's environmental lobby.

Increased complexity for diminishing returns is a common criticism of the QMS. Torkington (2016) outlines how new QMS solutions introduced new complications and risks. One particular issue he raises, one that increased complexity whilst simultaneously removing a critical systemic component, was the move from ITQ as a fixed tonnage harvest right to ACE. Torkington (2016, p. 181) explains that the shift to shares in a TACC from fixed tonnage, "was accompanied by the abandonment of resource rentals" which were a central component of the QMS as they kept markets competitive and prevented the development of monopolies. Hersoug (2018, p. 103) identifies the growing complexity as well, noting that:

> What initially was conceived as a simple, market driven system, where responsibilities should be left with the operators, has ended up as a very complex system, requiring extensive research, constant tinkering by government and where disagreements have to be solved in court.

In particular, Hersoug (2018, p. 103) explains:

> Instead of the TACC being a finely tuned tool, which is adjusted frequently in order to keep a stock healthy whilst maximizing harvest, it becomes a blunt tool to be adjusted only after serious issues or imbalances have developed in the fishery. The point here is not to criticize the TACC setting strategies used in the QMS, but to point to the obvious problem of creating 642 different management units.

Similarly, Walshe (2010, p. 66) explains how "the Ministry's intention was that regulations be decreased under ITQ as a move to a market-based management approach; an assumption touted by the Ministry as one of the major benefits of ITQs." Walshe (2010, p. 66) goes on to note that "the reduction in regulation did not happen, in fact the reverse occurred." The QMS was largely sold as an environmentally sound fisheries management system. However, a number of critics have noted that it has not delivered the promised outcomes. "ITQ solutions have not contributed to increased sustainability, neither in biological nor in social terms" (Hersoug, 2018, p. 109). The QMS is "stifling kaitiakitanga [guardianship]" (McCormack, 2018, p. 274).

Fragmentation of Māori quota

There are two specific ways in which regulations have fragmented Māori fishing rights: the separation between commercial and customary quota and the allocation of settlement quota to iwi. This section will outline the literature and history around both of these issues.

In 1989, the Māori Fisheries Act began the process of allocating quota to Māori with an interim settlement which saw the creation of a Māori Fisheries Commission (subsequently renamed the Treaty of Waitangi Fisheries Commission or Te Ohu Kai Moana/Te Ohu Kaimoana (TOKM), a body intended to receive 10% of all fish species already in the QMS and $10 million to hold and manage this quota (De Alessi, 2012). The 1989 Act also included "provisions for the Crown to recognise tino rangatiratanga by enhancing Māori involvement in the control and management of fisheries, and the recognition of taiāpure (local fishery areas)" (Bess, 2001a, p. 28).

In 1992 the government passed the Treaty of Waitangi (Fisheries Claims) Settlement Act granting Māori 10% of the quota ownership rights for the 26 marine species already in the ITQ system, 20% for all species added in the future, and 50% shares in Sealord, the nation's largest fishing company (Boast, 1999). The 1992 "'settlement' assets were added to the 1989 'pre-settlement' quota, cash, and shares, which by 1992 were worth about NZ$250 million, bringing Te Ohu Kai Moana's total assets at that time to about NZ$400 million" (Webster, 2002, p. 348).

The 1989 Act had envisioned the Māori Fisheries Commission retaining and managing the assets for the benefit of all Māori (Webster, 2002). However, this position was reversed in the 1992 Act which instructed the commission to allocate the pre-settlement assets to its beneficiaries, only retaining management of the Sealord shares and future quota shares awarded in the final settlement (Webster, 2002). The 1992 Act determined that there were to be two separate processes of allocation:

> The first is for the distribution of assets already held by Te Ohu Kai Moana, that is, – the existing quota, shares and cash – PRESA [Pre-settlement assets]. The second is for the distribution of the benefits from new assets acquired under or subsequent to the Deed of Settlement – POSA [Post-settlement assets] (Clarke & Sundakov, 2002, p. 3).

The quota allocation processes were contentious and contested, becoming "a 12-year project…undertaken to decide how the settlement was to be divided equitably among iwi" (Day & Emanuel, 2010, p. 63). The main issue of contention was whether the allocations should go to 'iwi' or be given to 'all Māori' regardless of iwi or hapū affiliation, including urban Māori who were more likely to have lost these affiliations. Māori formed two conflicting blocs: the Treaty Tribes Coalition and the Area One Consortium (Webster, 2002). The coalition argued that "traditional rights to an area of land necessarily implied traditional rights to the fisheries of any adjacent marine waters", while the "the consortium iwi asserted that although traditional inshore fisheries were often dominated by hapū or iwi who

controlled the adjacent land, considerable evidence showed that deepwater rights had traditionally been shared between iwi without regard to coastlines" (Webster, 2002, p. 354). The 1992 Act also:

> [D]istinguished Maori commercial and customary use rights as separate legal, economic and cultural categories; the former to be satisfied by the advancement of monies and quota, and the latter by the eventual promulgation of Fisheries (Kaimoana Customary Fishing) Regulations, 1998 (McCormack, 2010, p. 27).

This division was driven by a long-held "assumption that Māori fishing activity should be limited to subsistence use", despite Tribunal reports supporting Māori claims that their customary fishing had also always had commercial elements (Bess, 2001a, p. 27). The customary regulations were "promoted as a tool to enhance Maori local control and management of fisheries and, as such, seem to provide a neat fit with post-neo-liberal policies" (McCormack, 2010, p. 27). Māori could exert their customary fishing rights in accordance with "tikanga within the jurisdiction of two types of designated fishery areas, the taiāpure and mātaitai reserves, and by using customary regulations" (Memon et al., 2003, p. 207). Customary quota can only be used to provide fish for ceremonial occasions, such as hui (meetings) and tangi (funerals) (Webster, 2002).

In 1998, "after much debate and consultation, an unprecedented majority of iwi reached agreement" and TOKM announced its proposed optimum pre-settlement allocation method (Clarke & Sundakov, 2002, p. 3). This proposed inshore ITQ being allocated according to iwi coastline adjacent to their rohe while deepwater ITQ was to be allocated so that half will use the coastline basis, and the other half will use a population basis (Bess, 2001a). The "other pre-settlement assets, such as shares in TOKM and cash holdings, will be allocated to iwi according to the volume of ITQ allocated to them and the iwi population basis, respectively" (Bess, 2001a, p. 30). However, due to unresolved litigation, this method was not implemented and three years later a new allocation strategy was issued, which "stated that PRESA and POSA would be allocated using the same allocation method, and four possible allocation methods were suggested" (Lock & Leslie, 2007, p. 33). These methods "varied in the extent to which the assets were held in a centralised organisation and on whether population and/or coastline were used to determine the allocation of assets to tribes" (Lock & Leslie, 2007, p. 33). The 2004 Māori Fisheries Act finally resolved the 12-year dispute, "stipulating that they would be allocated to iwi based on coastline" but also "dictated that the allocation of post-settlement assets (the Sealord quota) would be split, with 25 per cent based on coastline and 75 per cent based on population." (De Alessi, 2012, p. 404). Regarding the 25/75 split, there were "some exemptions and alternative allocation rules… put in place to ensure that iwi were not disadvantaged" (Lock & Leslie, 2007, p. 33). Also, "quota for species in the Chatham Island zone is allocated to iwi slightly differently in recognition of the dependence of the Chatham Islands on fishing", while "the inshore quota in the Chatham Islands

is still allocated based on the coastline, the deepwater quota is allocated based on 50% population and 50% coastline." (Lock & Leslie, 2007, p. 33).

The distribution of fisheries assets amongst iwi fragmented quota (Memon & Cullen, 1992). Māori Quota Ownership was dispersed between 57, and later 58, iwi (mandated iwi organisations are discussed below), Aotearoa Fisheries and Sealord. This was not an incidental outcome but rather a necessary one. As Memon et al. (2003, p. 207) note, "fragmentation of Māori fishery rights was imperative for effective implementation of the quota management system." Similarly, TOKM (2018, pp. 3-4) states that this:

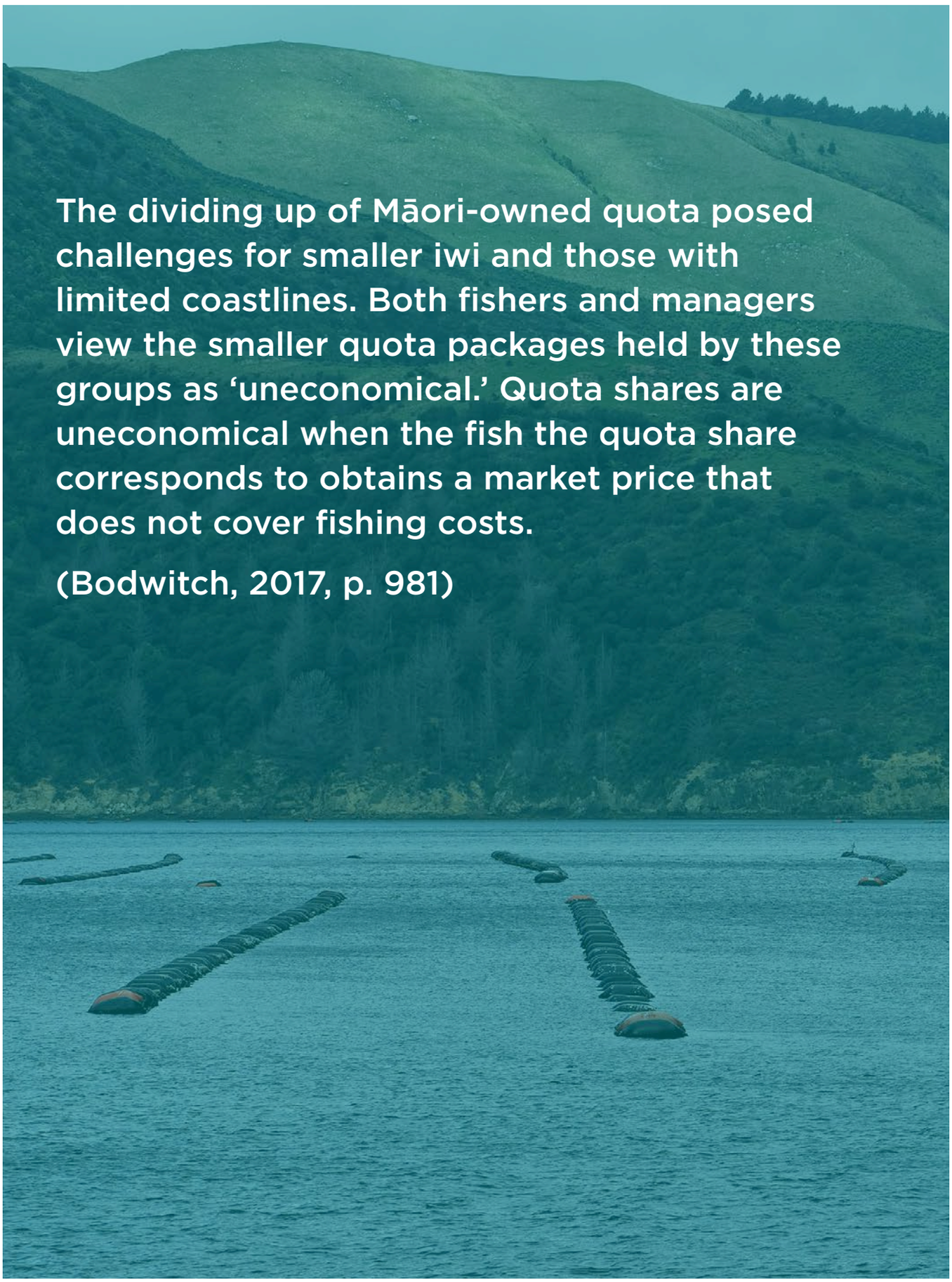
> [W]as a deliberate and widely supported feature of the design of the Fisheries Settlement. Iwi ownership of relevant quota parcels maintains the connection between particular peoples and particular fisheries that are an important part of the maintenance of iwi identity." However, ownership of quota in "this dispersed fashion delivers very modest rates of return (TOKM, 2017, p. 24).

This means, as TOKM (2017, p. 24) explains, "most individual Iwi do not own sufficient quota to undertake commercial fishing on their own." McCormack (2018, p. 283) makes the same point, "the quota held for a particular species is often too small to sustain a local fishing venture", continuing that "iwi-owned quota packages often contain a disproportionate amount of high-volume species on the lower end of the commercially valuable spectrum." Song et al. (2018, p. 290) also explain how "the settlement allocated far less quota to tribes than that needed to sustain the primarily inshore operations Maori fishers participated in pre-ITQ system implementation." "Most, if not all, iwi have small deepwater holdings that are objectively uneconomic to fish independently," Katene (2011, p. 8) explained during a Ministerial Inquiry into Foreign Charter Vessels, noting that the "small size of iwi holdings is a result of some Settlement quota being held in the centralised companies, and the remainder of the quota being devolved to 57 iwi, creating highly fragmented ownership." Bodwitch (2017, p. 981) also identifies this issue:

> The dividing up of Māori-owned quota posed challenges for smaller iwi and those with limited coastlines. Both fishers and managers view the smaller quota packages held by these groups as 'uneconomical.' Quota shares are uneconomical when the fish the quota share corresponds to obtains a market price that does not cover fishing costs.

The division of quota across iwi saw ITQ, and later ACE, divided up in such a way that many species were uneconomic to be commercially harvested. While the significant percentage of quota owned by Māori authorities gives the appearance that Māori have control over a large portion of the sector, as TOKM (2017, p. 24), notes, Māori dominance in the fishing sector is overstated as "not all Maori owned quota flows through Maori owned value chains. Instead it is fragmented into competing seafood companies." This is an issue further compounded by the wider QMS regulations.

Furthermore, many iwi are not well enough resourced in terms of finance and capacity to meet the regulatory requirements that come with actively fishing quota. As Memon and



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(Bodwitch, 2017, p. 981)

Kirk (2011, p. 111) explain, one pressure on:

> Maori commercial fisheries is the ability to manage their assets in accordance with the requirements of their iwi and the Ministry of Fisheries. Many of these mandated iwi organisations have a limited capital base, and the ability to hire or train experts to monitor and comply with ITQ requirements may be difficult.

McCormack (2018, p. 283) also identifies the lack of capital and capacity, explaining that "many iwi do not have the technology or capital to harvest, in particular, deep-sea fish" and that "while some Māori settlement quota is owned as part of a more diversified set of asset holdings, for many iwi fishing quota is their only significant asset." Hersoug (2018, p. 105) also identifies this as an inhibiting factor:

> [Iwi] did not necessarily have the economic capacity or the managerial capability to run fishing businesses in a highly competitive environment. The easy solution was then to lease out the quota (and gradually the ACE), and base the income on quota fees. In the beginning, the expectations of many Maori connected with fisheries were that the new arrangement would assist them in establishing viable fishing enterprises, by leasing quota at favourable prices. However, many of the new corporations were more concerned with the short-term goal of maximizing profit. If non-Māori fishers or established companies paid better, they would be preferred.

Consequently, most iwi lease their quota as ACE, a practice focused largely on maximising financial gain and driven by the limitations outlined above. While many iwi would, in an ideal world, be actively fishing their quota, issues around fragmentation and capacity, amongst others, mean that for many the best course is to lease the ACE and focus on gaining as much return from this so they can funnel the income into other more worthwhile projects. Katene (2011, p. 8) explained how fragmentation necessitates "some form of ACE leasing arrangement." Song et al. (2018, p. 290) also note this issue:

> Given that the settlement allocated far less quota to tribes than that needed to sustain the primarily inshore operations Maori fishers participated in pre-ITQ system implementation, the primary quota management strategy Maori leaders employ is to lease quota and use the profits to purchase additional quota.

Likewise, McCormack (2018) details how both the small quota sizes for specific species and the disproportionate amount of high-volume, low-value species Māori received quota for, as well as market mechanisms of the QMS itself, have all made leasing the only way to economically utilise the settlement quota. Ultimately, as TOKM (2017, p. 50) concludes, "most Iwi are passive quota owners who are not deeply engaged in the active fishing industry or well represented in the key decision-making structures within the wider fishing sector." Quota fragmentation also generates tension between short and long-term economic goals. As Song et al. (2018, p. 290) explain:

> Given that the settlement allocated far less quota to tribes than that needed to sustain the primarily inshore operations Maori fishers participated in pre-ITQ system implementation, the primary quota management strategy Maori leaders employ is to lease quota and use the profits to purchase additional quota. Tribal

> leaders' attempts to devolve quota rights to individual fishers would theoretically enable the fisher to determine where his/her surplus value goes, securing fishers' access to fish and therefore rectifying exclusion to a certain degree. However, the contradiction is that this direct allocation would place iwi in competition with the fisher for his surplus value, needed by both parties for quota expansion. In short, as the tribal leaders' handling of quota is subsumed into the same modus operandi, they, also, manage quota for capital gain rather than as a right to fish. This has unfortunately meant that the quota asset cannot be managed both to address contemporary fishers' exclusion and as a long-term investment asset.

Further contributing to the problem of fragmentation, iwi are unable to trade settlement quota (SET) beyond a limited pool of other iwi authorities. No SET has been sold since allocation in 2004 (McCormack, 2018). Outlining the requirements, Memon and Kirk (2011, p. 113) explain that to sell their quota, a "mandated iwi organisation must hold onto its quota for at least two years after coming into its possession and must obtain at least 75% voting confidence from the iwi members itself until it can be sold." These legislative provisions aimed at restricting the disposal of Settlement Quota "had quite strong support in 2004" (Castle, 2015, p. 60). One of the concerns was that the Fisheries settlement halt any further alienation of the fisheries taonga. There was:

> [U]neasiness that the '*fragmentation*' of fisheries assets ownership through planned transfer of quota and shares from TOKMTL [TOKM Trustees Limited, or TOKM] to MIOs [Mandated Iwi Organisation, explained below] might precipitate the same consequences in the 21st century as the 'fragmentation' of the ownership of Maori land in the 19th century (Castle, 2015, p. 61).

As Castle (2015, p. 61) highlights, one of the lessons learnt from the land fragmentation was the "need to generate sufficient free cash flow from fisheries assets to meet the responsibilities of ownership and to deliver adequate benefits to owners." The need to maintain the integrity of the fisheries asset as a whole overcame the potential risk of the value diminishing through fragmentation. However, while this need was seen to be met by providing settlements to mandated iwi organisations with a restriction on quota sales, as one government official told Memon and Kirk (2011, p. 113), the restrictions to "iwi sale of quota [is] to the detriment of long term goals." These sale restrictions have resulted "in at least some of the iwi fisheries assets being highly illiquid", leaving "iwi with a sub-optimally diversified investment portfolio" (Day & Emanuel, 2010, p. 63). Fundamentally, the "restrictions limit its ability to be sold, thus restricting its value" (Memon & Kirk, 2011, p. 113).

While referring to the situation in the United States De Alessi et al. (2014, p. 223) note that "[e]conomists estimated that restrictions on quota transfers reduced the value of halibut IFQ [Individual Fishing Quota] by roughly 10%", giving a possible indication of what the sales restrictions cost Māori. This is reinforced by another US focused review, which found that the:

> [C]osts of restrictions on catch shares, ranging from restrictions on quota leases and sales, ownership eligibility, and inter-sector transfers,

> among others, estimated that reduction in value caused by restrictions imposed on the West Coast groundfish fishery is also about 10%" (De Alessi et al., 2014, p. 223).

This fragmentation of quota generates economic inefficiencies as small to medium iwi struggle to reach the scale required to operate independently (Day & Emanuel, 2010). In 2015, seven anonymous Te Tai Tokerau iwi made a submission to be able to trade their quota on the open market during a review of Māori fisheries management (Thomas, 2015). This submission was opposed by some of the larger iwi, who believed that the Māori quota should stay in Māori ownership (Thomas, 2015).

Fragmentation is also generated by the division between market and nonmarket (customary and recreational) quota. As TOKM (2018, p. 1) explain while the 1992 Act "enshrined Māori fishing rights within the current fisheries management system, it created an artificial separation between customary and commercial fishing." This is reinforced by Memon and Kirk (2011, p. 106), who note that the "Maori Fisheries Settlement has fragmented and created structural tensions in the exercise of Maori commercial and customary rights." In particular, Memon and Kirk (2011, p. 109) explain that "this fragmentation has… created risks of conflict and competition between Maori customary commercial and customary non-commercial fishing interests over access to fish." The distinction between commercial and customary also creates a degree of governance fragmentation:

> This disjunct within the administrative arrangements for the commercial and customary aspects of the Fisheries Settlement can be challenging for iwi for several reasons. MIOs, nearly all of whom have received their commercial settlement assets, are developing their assets for the benefit of their people. However, MIOs are not necessarily responsible for managing customary fishing for an iwi as this typically rests with hapū and marae, as provided for under various fishing regulations. (TOKM, 2018, p. 2).

Highlighting another tension created by this division, Memon and Kirk (2011, p. 113) note how customary "rights are increasingly spatially juxtaposed, competing for the same fish alongside other commercial and recreational fishers."

Regulatory and jurisdictional fragmentation

The regulatory and jurisdictional framework that governs Aotearoa New Zealand's marine space is a complex agglomeration of varying pieces of law, built up over decades in response to different needs and requirements, forming—like most legal frameworks—a somewhat ad hoc, reactive, and inconsistent tapestry. Likewise, there are a significant number of mandated stakeholders exercising governance and management responsibilities across the moana. In 1999, the Parliamentary Commissioner for the Environment (1999, para. 1) noted that the "marine environment is a large, complex system with many overlapping and conflicting interests, agencies, processes and legislation." As Peart et al. (2017, p. 31) explain, the "legal

framework applying to the management of New Zealand's marine estate is both complex and fragmented. Numerous pieces of legislation apply to the marine area, administered by multiple agencies at both central and regional government levels." There are "18 main statutes, 14 agencies, and six government strategies for marine management and planning in New Zealand", making the governance and management of the space incredibly complicated (McGinnis, 2012, p. 10).

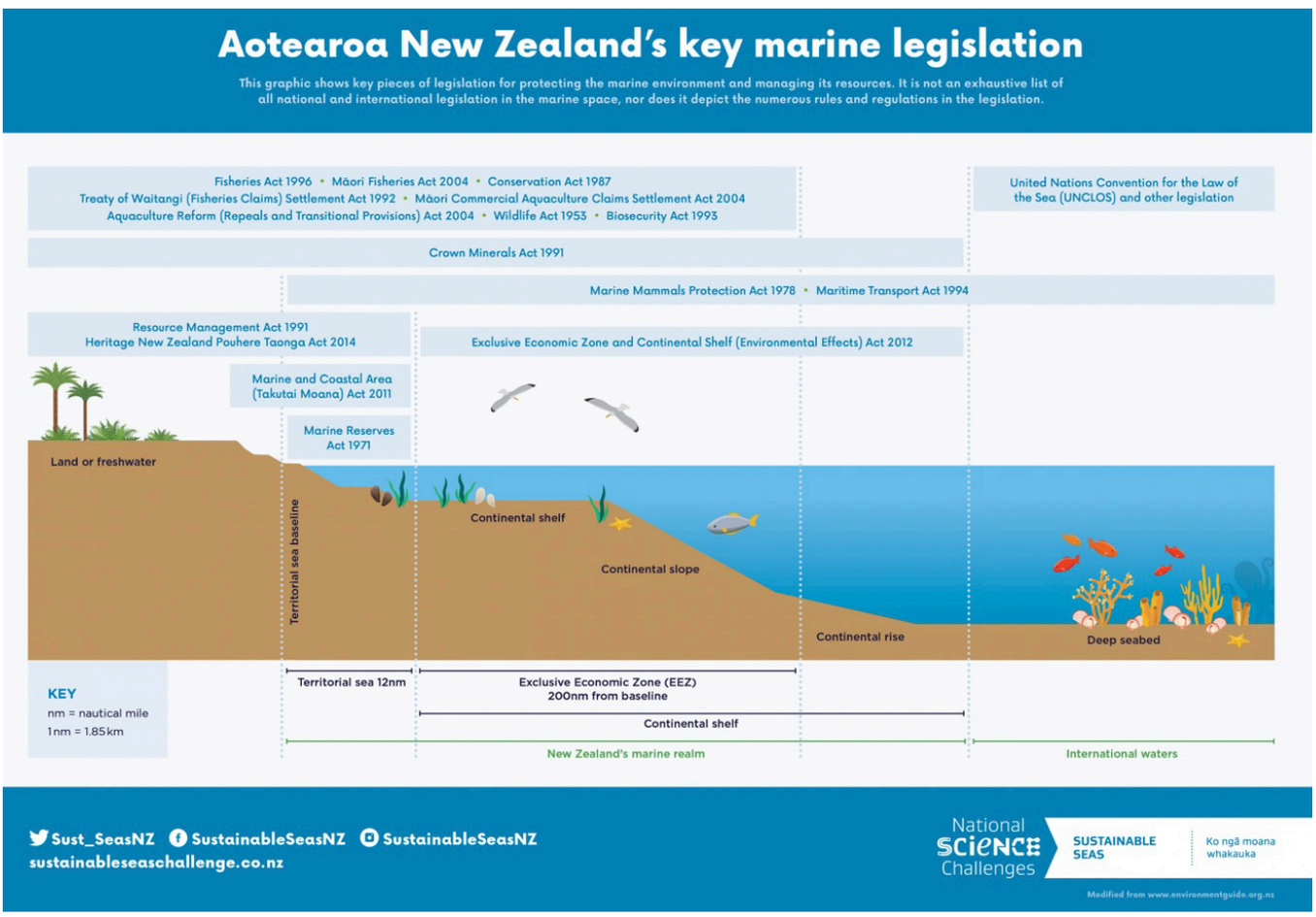
Aotearoa New Zealand followed "the traditional pattern, common to other jurisdictions, of enacting sectoral-based legislation to govern the use of resources in and protection of, the marine and coastal environment" (Vince & Haward, 2008, p. 414). There are a range of laws that cover the marine space. Three key pieces of legislation form the marine legal framework—the Resource Management Act 1991 (RMA), Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act) and the Fisheries Act 1996. Added to this, there are the various acts outlined above that legislate Māori fisheries as well as conservation legislation including the Conservation Act 1987, Marine Reserves Act 1971, Marine Mammals Protection Act 1978 and Wildlife Act 1953. The RMA devolves management to regional councils and territorial authorities, who are required to develop their own management plans, adding further complexity and variation to the framework. The Sustainable Seas Challenge provides a useful graphic showing this legislative framework (see following page): Note: Sustainable Seas National Science Challenge (2020).

The legislation covering the marine space is "fragmented, complex, inaccessible, riddled with gaps and inconsistencies, defined by conflict, and outdated when it comes to its underpinning norms (including the principles of te Tiriti o Waitangi)" (Severinson, 2021, p. 46). As McGinnis (2012, p. 10) notes, "marine planning and decision-making are made more complicated by the fractured framework of laws, regulations, and practices that have been developed in New Zealand over the past 30 years." An EnviroStrat report (2019, p. 8) notes the fragmented legislative framework and the issues this poses for the blue economy:

> New Zealand has a substantial but complex and fragmented governance and legal framework for coastal and oceans management. This represents a major challenge for transitioning to a more integrated Blue Economy… Inconsistencies among regional council policies and between regional and national policies are identified by many as an impediment to blue economy investment and development… The regulatory context is complicated further by a raft of 'one off' specific purpose laws that impose specific approaches, exclusions or regulations in spatially defined areas.

Bess and Rallapudi (2007, p. 723) explain how "[s]patial conflicts intensify when competing uses of fisheries resources and varied levels of protection for the same area are recognised in legislation." They go on to note that the "[i]mplementation of inconsistent legislative obligations sometimes causes government agencies to disagree about the extent and the way to utilise fisheries resources and protect the marine environment" (Bess & Rallapudi,

Figure 1. *Aotearoa New Zealand's key marine legislation*



Note: Sustainable Seas National Science Challenge (2020).

2007, p. 723).

One example of this tension is how the:

> 1971 Act requires the Department to give priority to setting aside areas as marine reserves for scientific study. The establishment of a marine reserve, along with the Government's no take policy, prevents the Ministry from taking actions to uphold the purpose of the 1996 Act to provide for sustainable utilisation (Bess & Rallapudi, 2007, p. 723).

"In more recent times," Peart et al. (2017, p. 32) note, "there has been a proliferation of bespoke regional legislation, indicative of problems with the general applicability of the national legal framework." Noting another problem that arises out of the fragmented and complex legislative framework, Severinson (2021, p. 46) believes it is "also arguably unfair for those using it and those with rights and privileges created under it." One of the key barriers preventing further legislative integration are unresolved Māori grievances. "Māori customary rights and those under Te Tiriti o Waitangi— The Treaty of Waitangi (Treaty) in the marine area have yet to be fully resolved, complicating broader scale legislative reform" (Peart et al. 2017, p. 31-32). McGinnis (2012, p. 8) also identifies "Māori interests, perspectives and treaty obligations" as significant issues that need to be dealt with for any legislative consilience.

Dodson (2014, p. 522) also notes, regarding developing co-governance and co-management structures, that a "significant contributor to this underdevelopment is the

slow pace of legislative review and reform required to establish new institutions of conservation management in New Zealand." As he continues, "the mechanisms through which conservation partnership and co-management/governance can be instituted remain weak and unclear, potentially undermining a discursive commitment to the meaningful involvement of Maori" (Dodson, 2014, p. 526). The issue identified is:

> [S]ection 56 of the Conservation Act of 1987 [which] provides for the establishment of ministerially appointed ''advisory committees'' to advise the Department in relation to particular conservation areas, including marine reserves. Such committees possess no official decision-making authority and merely provide advice to the Minister and Department of Conservation (Dodson, 2014, p. 526).

Governance and management

Along with the fractured legislative framework, there is a diverse and often competing array of actors in marine governance. In his lengthy examination of Aotearoa New Zealand's marine governance, the main conclusion McGinnis (2012, p. 8) comes to is that "the existing marine governance framework in New Zealand emphasises a traditional sector-by-sector approach to management and planning, and that this fragmented governance framework contributes to a number of institutional challenges." The key challenges he identifies are: a spatial and temporal overlap of human activities and their objectives, causing conflicts (user–user and user–ecosystem conflicts); a lack of connection between the various authorities responsible for individual activities; a lack of connection between offshore activities, resource use, and the onshore communities that are dependent on them; and, a lack of protection of culturally and ecologically sensitive marine areas (McGinnis, 2012). "Marine governance in New Zealand", McGinnis (2012, p. 30) continues, "is symptomatic of the problem facing most coastal states – resource management and the management of impacts of human beings remains highly 'balkanized' and often supports single-sector approaches to manage specific effects or uses." The "framework is currently diffused, decentralized, and highly fragmented with a range of activities managed by separate administrative jurisdictions and authorities" (McGinnis, 2012, p. 53).

There are numerous central government ministries, departments etc responsible for different components of marine governance, including:

- The Ministry for the Environment (MfE) (tasked with managing and sustaining the marine environment)
- The Ministry for Primary Industries (MPI) (tasked with managing and enforcing the QMS)
- The Ministry of Business, Innovation and Employment (MBIE) (tasked with development of commercial actors in the marine economy)
- The Ministry of Justice (MOJ) (tasked with oversight of the legislative framework, judiciary and punishment of infringements to the QMS)

- The Ministry of Foreign Affairs and Trade (MFAT) (tasked with international trade issues relating to the marine economy)
- The Ministry of Defence (MOD) (tasked with supporting MPI in managing and enforcing the QMS)
- The Department of Conservation (DOC) (tasked with managing and protecting marine reserves)

Each regional council is also tasked with managing their marine areas through the development of regional coastal plans extending from mean high water springs to the edge of the territorial sea. "Regional councils", however, as McGinnis (2012, p. 52) explains, "lack the institutional capacity to effectively and responsibly address issues associated with the coastal-marine interface or, more generally, marine areas out 12 nm." In 2002, Hersoug (2002, as cited in Winder, 2018, p. 89) noted that the then Ministry of Fisheries "acknowledged 37 government agencies and stakeholders in addition to Māori, who, as Treaty partners, exercise guardianship of resources, and must be partners in resource management, not simply stakeholders to be consulted."

Māori authorities and organisations play a number of roles in marine governance as well. Memon and Kirk (2011, p. 110) identify three levels at which Māori commercial fisheries governance landscape can be conceptualised:

> [N]ationally, as a Treaty partner with the Crown to govern the allocation and management of all fishery resources (a meta-policy-making role); regionally, as a stakeholder in co-management arrangements with other commercial quota holders to collectively manage commercial fisheries; and Maori collaborating within pan-tribal, and iwi and hapu institutional settings to manage commercial quota allocated to them under the Maori Fisheries Settlement on a collective basis nationally, regionally, and locally.

The broader role for Māori in commercial fisheries governance alongside the central government as a Treaty partner has "essentially been limited to an advisory role alongside other non-Maori commercial quota owners" (Memon & Kirk, 2011, pp. 106–107). This is largely due to the Crown's paradoxical insistence on "maintaining sole regulatory power over the commercial fishing industry while promoting the benefits of devolved authority" (Memon & Kirk, 2011, p. 106–107). The state plays both the role of the mediator of spaces of governance as well as being a significant actor within them, which "poses a further structural barrier to the exercise of Treaty fishery rights" (Memon & Kirk, 2011, pp. 106–107).

In the 1990s, along with a number of other key changes and tweaks, such as the ACE and LFR, there was "a vision for a more independent fisheries sector with a reduced role for government" (Connor & Shallard, 2010, p. 350). The incentive structures that are inherent in the property rights of ITQs were understood to hold the key to this decentralised governance of fisheries as they would "allow transfer of much of the responsibility of fisheries management to stakeholders" (Connor & Shallard, 2010, p. 350). The government promoted

"stakeholder-led plans encouraging input from all user groups" during the 1990s and into the 2000s (Yang et al., 2010, p. 263). There were three main issues with this:

> First, there was confusion over who might the stakeholders be and therefore who is entitled to be involved in the fisheries plans. Second, distrust between commercial and non-commercial stakeholders and environmental NGOs groups created communication barriers in both creating and implementing a commercial-led plan. Third, there was reluctance by commercial groups to take the leading position; commercial stakeholders had to bear the costs of organising and facilitating meetings with groups who were basically attempting to constrain the industry (Yang et al., 2010, p. 263)

Since the 1990s, the sector has seen:

> [S]takeholder led cross-sector planning in the rock lobster fisheries, devolved management responsibility and private stock enhancement in the scallop fisheries, a devolved quota registry and contracted catch reporting system run by an industry-owned company, and collaborative processes of research planning and stock assessment with research delivered by a combination of government and private sector providers (Connor & Shallard, 2010, p. 347).

"Despite this seeming foment of innovation," as Connor and Shallard (2010, p. 347) note, "the core governance system remains government dominated, with virtually all legally binding catch limit and regulatory decisions made by the Minister of Fisheries." As they (Connor & Shallard, 2010) note, a number of attempts to decentralise governance have been thwarted and many of the relationships between the government and other stakeholders have been strained, with a 'culture of litigation' developing. By the mid 2000s, much of the focus on decentralised planning had been abandoned (Yang et al., 2010).

As well as governance roles for commercial fisheries, Māori—rūnanga and marae komiti specifically—are charged with nominating the individuals to serve as tāngata kaitiaki for customary fishing areas. Tāngata whenua are also provided scope in the regulations to have input into the activities of commercial and recreational fishers in their customary fisheries, with 'iwi planning' documents able to be submitted under the RMA and, consequently, taken into consideration by local and regional councils in the development of their plans and the reviewing of resource consents. They are also able to make bylaws in their mātaitai, which apply to everyone fishing in the mātaitai. The customary level sees a range of conflicting claims to legitimate governance. As Memon et al. (2003, p. 215) explain:

> [R]epresentation is an issue that has also proved contentious in the expression of tino rangatiratanga in managing and rehabilitating customary fisheries. For example, concerns were raised about the proposal for the Maketu taiāpure by another Maori group. Tapuika me Waitaha claimed that the applicants, Te Ihu o te Waka ki Maketu, did not hold tangata whenua status within the Maketu area. Tapuika's dispute was based on claims of their traditional tangata whenua status and ahi kaa (continued occupation) since the arrival of the Te Arawa waka (canoe). In reply, Te Ihu o te Waka ki Maketu gathered historical sources arguing that Tapuika had failed to maintain ahi ka roa (fires kept burning, an expression of continued

> occupation) in the Maketu area, as the district had been occupied by several different iwi since the arrival of the waka, their ancestral canoe.

In their research, Maxwell et al. (2020, p. 6) found that the rūnanga and komiti charged with customary fishing management felt there was:

> [A] lack of respect for Māori rights with respect to marine management… [and] that some processes for marine management have excluded or overlooked Māori interests. Poor engagement with Māori on the part of government agencies was identified as reasons for Māori values being absent from plans.

The fragmented governance also generates and reinforces issues relating to poorly aligned geographic boundaries and domains. "Problems arise from fragmentation in the governance systems used to manage specific human uses of marine resources," McGinnis (2012, p. 30) explains, "together with spatial and temporal mismatches between ecological systems and the administrative processes created to manage human interactions with ecosystems."

Settlement structures

There are a range of settlement structures that add to the fragmentation of governance, specifically MIO and the wider Te Ohu Kaimoana ecosystem.

Mandated iwi organisations

A key aspect of the settlement was the need to form mandated iwi organisations to receive the quota (the structural requirements of these MIO are outlined in the whakatautika section). MIO create issues of integration through their ability to contribute to co-governance and co-management due to problems with perceived legitimacy and lack of capacity.

In terms of legitimacy, the history of 'iwi' as a political grouping is complex. Traditionally, fishing rights were held at multiple scales. Hersoug's (2003, p. 132) description is somewhat simplistic, ignoring much of the flux and variation across Māoridom before contact:

> [Māori had] an intricate system of nested rights… [where] extended families (whānau) controlled small streams, fishing grounds and shell beds in the immediate vicinity of their villages, sub-tribes (hapū) larger rivers, shellfish beds and certain fishing grounds while the tribe (iwi) incorporated the rights of its hapū and whānau.

The reality is that this may have been true for some iwi at some points in time, but it does not represent a continuous and comprehensive view of pre-contact Māori rights to fisheries. However, the iwi was to become the sole vehicle for fisheries settlements.

"Iwi were co-opted as state-mandated organisations early on in a process that included the disempowering of hapū and their leadership", McCormack (2021, p. 201) explains, noting how this "fundamental contradiction continues to be of enduring significance and has taken on new dimensions in relation to fisheries and marine settlements." A "prerequisite for settlements to proceed is that claimants 'establish a large natural group', as a means to streamline the negotiations" (McCormack, 2018, p. 274).

Therefore, during the decade of contention following the 1992 Act, TOKM was directed to decide what and who 'iwi' were. Eventually, TOKM determined that "iwi meant 'traditional' tribes…. because it was the traditional tribes from whom the treaty rights to their fisheries had been misappropriated, it was to these tribes that the rights should be returned" (Webster, 2002, p. 350). A contemporary tribe who was "traditionally acknowledged by other iwi" was accepted as 'traditional' and 'all Māori' would share in these allocations only insofar as they belonged to such iwi. "This last assumption", Webster (2002, p. 350) notes, "was to be the most contentious." McCormack (2018, p. 274) explains how this "prejudices smaller kin groups and ignores commentary that the basis of Māori society is hapū rather than iwi." She (McCormack, 2011, p. 290) then contextualises the decisions faced by negotiators within the wider shift to neoliberalism, explaining how:

> Neoliberalism, like liberal democracy, both constrains and enables indigeneity, though the spaces opened for indigeneity under neoliberalism reflect market rather than democratic rationality. Maori negotiators operating within these confines face the complex task of balancing the interests of whanau (extended family), hapu, and iwi. Overlaying these kinship structures is the institution of runanga (tribal councils)…

McCormack (2011, p. 292) also notes how:

> Maori negotiators operating at the runanga level must simultaneously balance the needs of whanau, hapu, and iwi… The need to balance, hapu, iwi, and runanga interests is an ongoing concern", revealing the political fragmentation generated by the process and resulting institutional architecture.

The iwi, as has been argued by many, was not the key socio-political grouping in traditional Māori society and the decision to allocate quota to iwi rather than hapū has had long term repercussions. Webster (2002, p. 352) notes that "iwi are not at all the stable traditional entities they are often supposed to be", showing how in 1974 there were about 42 iwi, then in early, 1998 there were about 55 and later that year TOKM acknowledged 78 iwi. "Recent increases", Webster (2002, p. 353) explains, "may be due to factors such as the promise of benefits deriving from the important role given iwi in government policies, and the fisheries commission's own power to decide who qualifies." As a result of this favouring of iwi, there have been "growing tensions between iwi and hapū" (McCormack, 2021, p. 202). This is an inherently political separation, as Arnold et al. (2002, p. 2) explain:

> [T]he assets distributed from the Treaty of Waitangi (Fisheries Claim) Settlement Act 1992 will be directed through Runanga and Tribal Councils (non-traditional umbrella organisations) toward iwi, while the hapū is typically the social unit at which traditional Māori fisheries management decisions are made (Ropiha, 1992). Therefore, the availability of resources for hapū managers will be highly contingent on the clarity of the mandate structure within Māori society. Our research indicates that mandate issues remain political and problematic, casting doubt on the ability of this hapū to access the resources they will need to manage their kāpata kai [food source or food store].

Regarding capacity, many MIO struggle to provide effective governance across their rohe moana due to lack of finance, skill, and

time. For example, Maxwell et al. (2020, p. 6) identify several related issues: "lack of resources to participate effectively in marine management, stretched capacity to engage with government agencies, and capability shortages to provide technical advice." This lack of capacity can have knock-on effects for rangatiratanga, "Māori quota being harvested by non-Māori businesses represents a loss of rangatiratanga, and therefore kaitiakitanga, due to Māori having to rely on non-Māori to fish Māori quota" (Matthews, 2018, p. 29). This is also an issue McCormack (2020, p. 96) identifies, discussing how one iwi she has researched:

> [H]ad no skill or capability other than capital and settlement quota, so [after suffering losses] the company was collapsed down to just quota. All of the vessels were sold, all the leases extinguished, the retail operations were closed and people made redundant.

As she (McCormack, 2020, p. 96) continues:

> The privately held ITQ [owned by the company] and the iwi settlement quota were then aggregated with the settlement quota of two other iwi and put into a new joint venture company… The iwi joint venture was subsequently "collapsed down" as a result of "fixed costs" and revenue being "tied to export commodities and subject to the swings and roundabouts of foreign exchange rates, they needed to find offshore markets and there is a lack of infrastructure and connectivity to those markets." The three partners "ended up getting $400,000 a year more just by leasing quota than having all this palaver of a business.

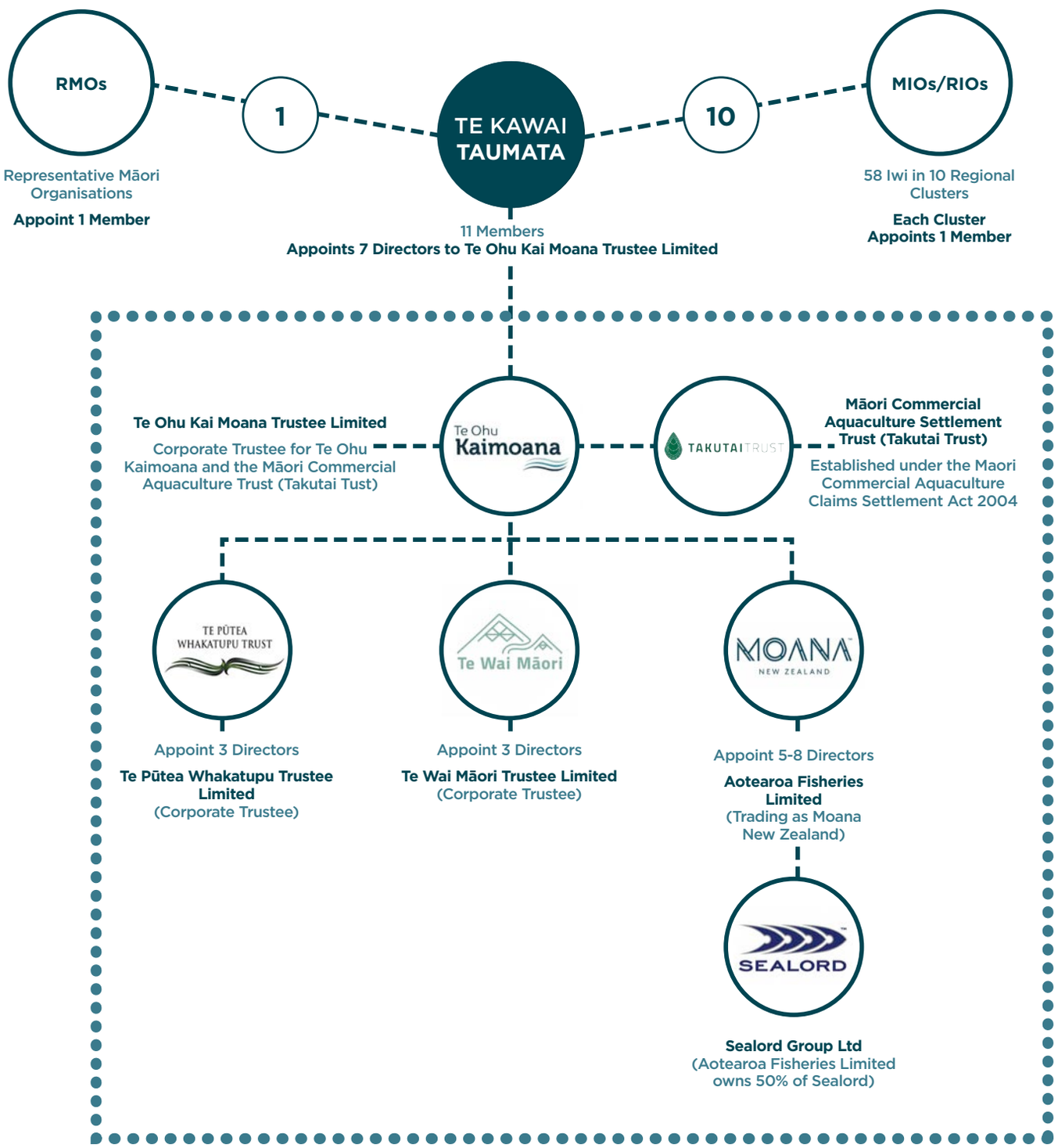
Te Ohu Kaimoana

The wider TOKM institutional architecture also constrains governance. This structure is shown on the opposite page (Note: Te Ohu Kaimoana. (2023).

In 2014, Tim Castle was appointed to undertake a review of the Māori Commercial Fisheries Structures, as had been mandated by the 2004 legislation. Castle (2015, p. 43) notes that "[t]he organisational structure of the Settlement is complex. In addition to the 57 MIOs and an equal number of asset holding companies (AHCs) there are three collective "benefit delivery" entities and two "governance" entities." The 2004 Act restructured TOKM, splitting it into a set of companies and trusts, with the two governance entities listed first: Te Kawai Taumata, which appoints and removes the directors of Te Ohu Kai Moana Trustee Limited; Te Ohu Kaimoana Trustees Limited, which holds the assets until they are allocated and manages Te Pūtea Whakatupu Trust, Te Wai Māori Trust and Aotearoa Fisheries Limited; Aotearoa Fisheries Limited, which controls the commercial side of the assets; Te Pūtea Whakatupu Trust, which uses its income to fund education and research related to Māori freshwater fishing; and Te Wai Māori Trust, which is mandated to advance Māori commercial freshwater fisheries (Lock & Leslie, 2007).

Castle (2015, p. 7) explains that "the single most significant finding and recommendation I make is that TOKMTL [TOKM] can and should now be wound-up." He justifies the winding up of TOKM by explaining that the trust has essentially done the job it was established for, having "distributed to Iwi 98% of the fisheries Settlement population assets by value; and 86% of the coastline assets by

Figure 2. *Te Ohu Kaimoana structure*



Note: Te Ohu Kaimoana. (2023).

value" by 2015 (Castle, 2015, p. 8). To date, this recommendation has not been enacted. As Castle (2015, p. 15) notes, "[r]educing or shortening the distance between Iwi owners and the managers/ governors of AFL [Aotearoa Fisheries Limited] will, in my view, significantly increase the very desirable prospect of developing successful synergies between those owners and managers." TOKM creates unnecessary governance complexity. There are also other issues of fragmented governance across the settlement structures, as Castle (2015, p. 42) details:

- Iwi have full ownership and governance rights over quota and cash allocated to them (subject only to a statutory process to sell Settlement quota)
- Iwi own 80% of the income shares in Aotearoa Fisheries Limited (AFL) but have no voting shares
- Iwi are the residual owner of the assets of Te Wai Māori Trust (TWMT) and Te Pūtea Whakatupu Trust (TPWT) but the Board of TOKMTL holds the one share in each and directors/trustees of both are appointed by TOKMTL

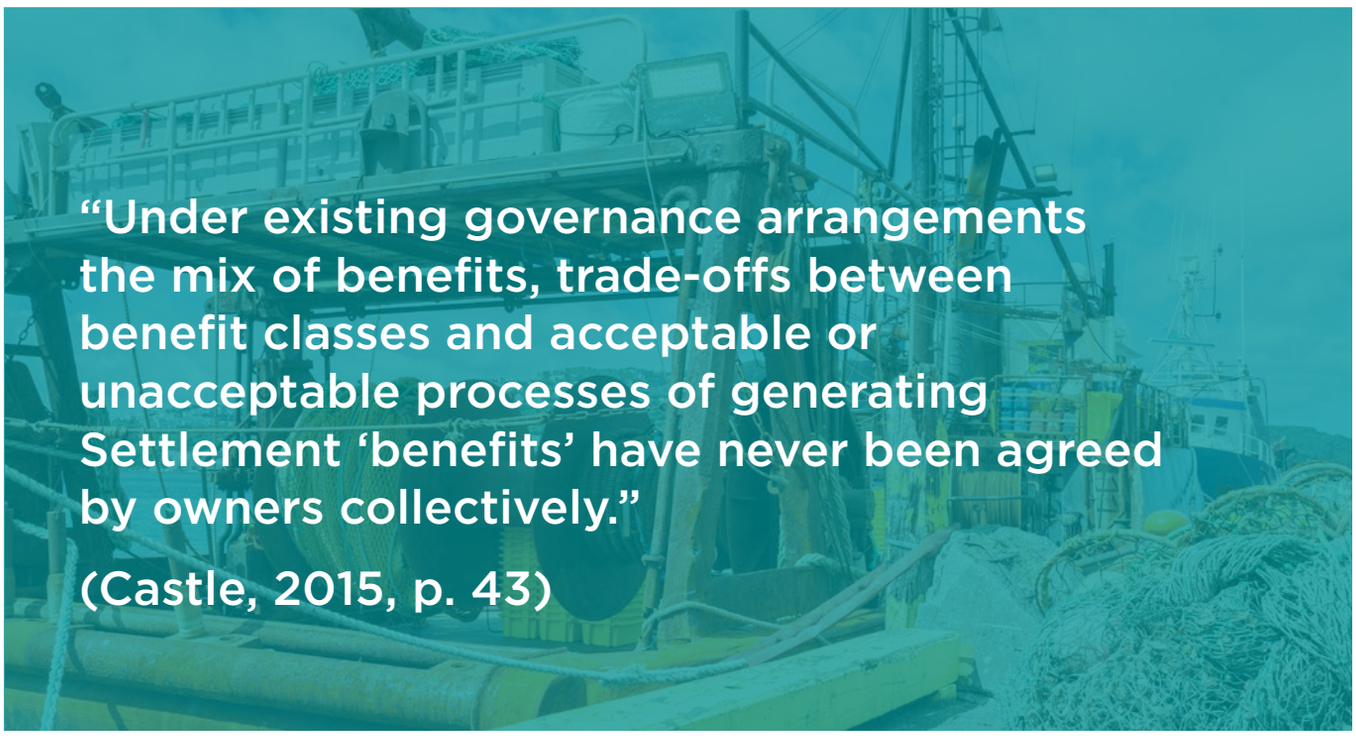
Iwi do not have a direct role in the appointment of TOKMTL but influence this process indirectly through an electoral college structure (TKT) [Te Kawai Taumata].

"Under existing governance arrangements," Castle (2015, p. 43) writes, "the mix of benefits, trade-offs between benefit classes and acceptable or unacceptable processes of generating Settlement 'benefits' have never been agreed by owners collectively." As Castle (2015, p. 49) continues:

> There appear to be two primary justifications for these extra governance layers: one practical, one theoretical. The practical justification is that in 2004, Iwi owners (MIOs) had not been established (in a sense of a structure, fully accountable to members) and had not received assets. Iwi were notional owners; they were not actual owners and therefore could not then exercise the rights and responsibilities of ownership. This situation was undeniable in 2004. In my view, it no longer applies in 2015. The theoretical justification appears to have been linked to the consequence of the allocation formula which delivered AFL shares on a population basis creating a few large shareholders and many small shareholders. The fear was that large shareholders would use their ability to dominate governance processes to disadvantage small shareholders. The protection in the 2004 Act against this possibility was to prohibit direct Iwi participation in AFL governance. It is not absolutely clear what weight was put on these parallel practical and theoretical considerations in 2004. That may not, now, particularly matter. In 2015, the theoretical concern warrants closer examination as the justification for an arrangement on the face of it contrary to at least conventional corporate governance practice.

TOKM's division of voting and income shares also fractures governance. The 2004 Māori Fisheries Act:

> [E]stablished the holding company AFL [Aotearoa Fisheries Limited, now Moana] and its governing body, Te Ohu Kaimoana ('TOKM'). AFL has two classes of shares, voting shares and income shares. All voting shares of AFL are held by TOKM to give them sole discretion in appointing the directors of



> AFL. The Act also stipulates that, 20% of the income shares of AFL are to be owned by TOKM with the remaining 80% to be held by local iwi. The income shares are divided among iwi according to the iwi's population (Day and Emanuel, 2010, p. 63).

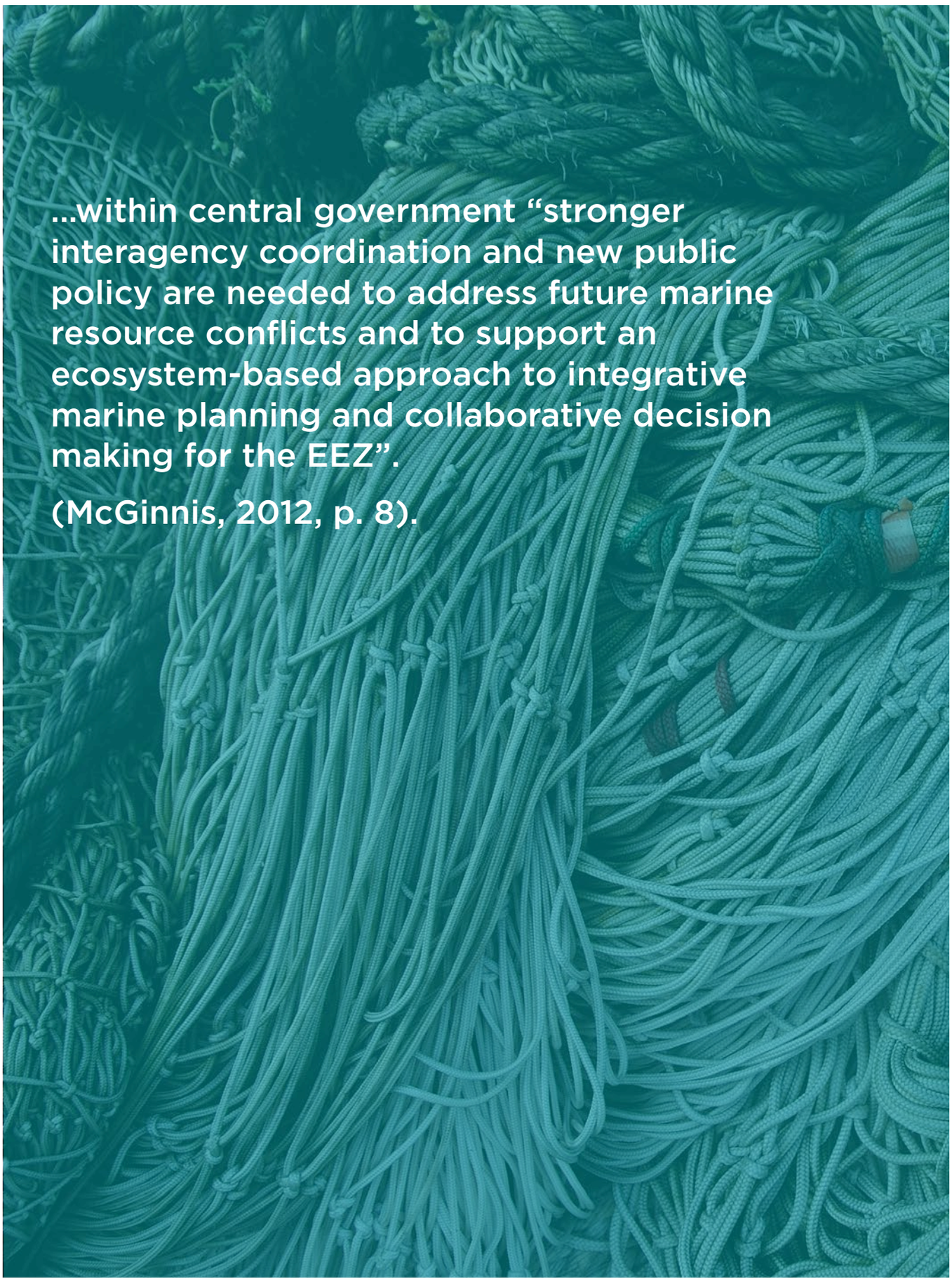
Castle (2015, p. 15) argues:

> [F]or the better achievement of the purposes of the Act and for the better delivery of benefits to Iwi owners, there must be, now, a much more direct connection between Iwi owners of AFL and AFL managers. This, I find, is best achieved by now eliminating the two layers of governance (TKT and TOKMTL) between Iwi and AFL. I recommend 100% of the voting (control) shares, and the balance of, 20% income shares, held effectively by TOKMTL as trustee for Iwi, be allocated out to Iwi.

The Treaty of Waitangi Fisheries Commission (2003) detailed how the "holding of the Voting Shares in AFL by Te Ohu Kai Moana on behalf of all Iwi enables Māori to stand together to develop their commercial interests and also provides AFL and the other companies with a unified and stable shareholder." However, as Castle makes clear, while this might have been a useful and cohesive solution previously, it has potentially become a device that generates, or at least exacerbates, fragmentation in marine governance.

The fractured governance within Māoridom is problematic in terms of exercising rangatiratanga over the moana. As Ngata (N.D., as cited in Matthews, 2018, p. 26–27) explains:

> A huge part of the responsibility of iwi is the ability to respond to government and to make our voices heard. Māori must have the ability to respond but not all iwi are resourced to be able to do so. Therefore iwi rely heavily on groups such as Moana New Zealand and Te Ohu Kaimoana and iwi groups active in the area, to represent them on these issues. There is always room for improvement and we need to come together as a group. The Kermadecs issue is an example where if iwi come together and take a stand on something, the government will listen.



...within central government “stronger interagency coordination and new public policy are needed to address future marine resource conflicts and to support an ecosystem-based approach to integrative marine planning and collaborative decision making for the EEZ”.

(McGinnis, 2012, p. 8).

1.2 Potential solutions

Integrated regulation and jurisdiction

One of the main ways to solve the fragmentation across the marine sphere is through integrated regulatory and jurisdictional frameworks. As McGinnis (2012, p. 44) concludes:

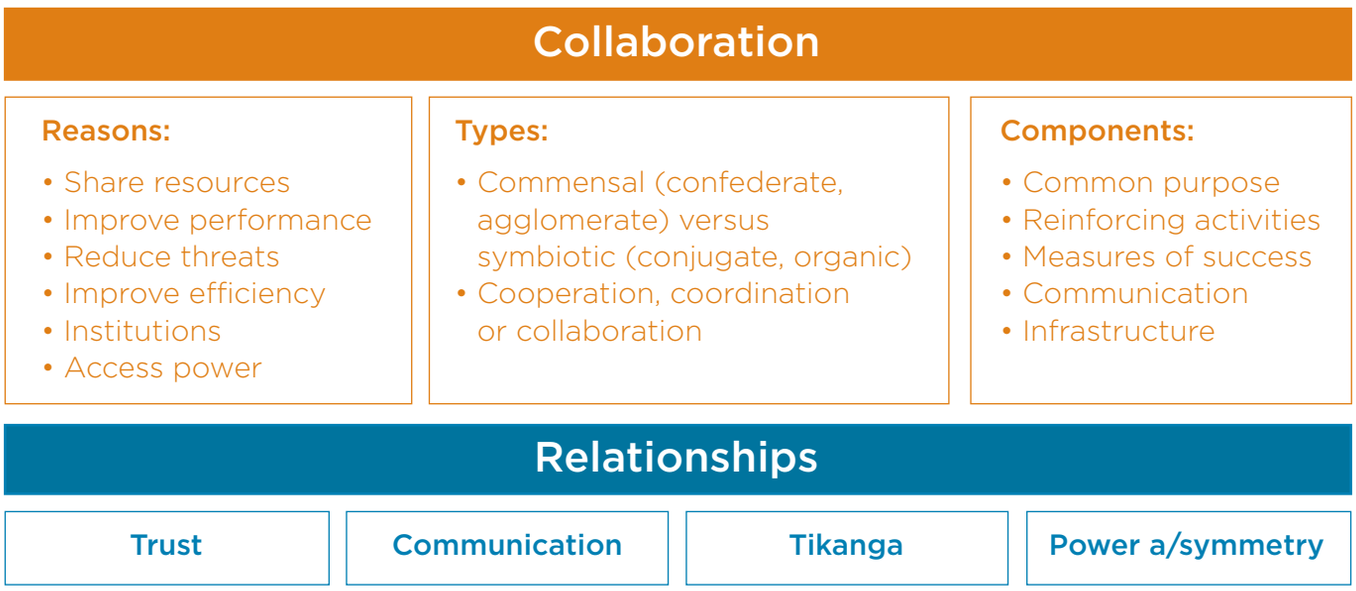
> Marine governance ultimately depends not only on the capacity and capability of institutions to address the synergistic impacts and pressures of multiple effects and uses but also on the cultivation of a broad ocean constituency in the public realm that supports a more integrative and holistic approach to marine planning and decision-making.

The move towards an integrated 'whole ocean' approach to marine regulation and jurisdiction has been on the 'drawing board' for a long time, with Helen Clark's Labour Government releasing a report in 1999 outlining the need for a comprehensive oceans policy and establishing an Oceans Policy Secretariat a year later (McGinnis, 2012). "Impetus for the development of an oceans policy in New Zealand", Vince and Haward (2008, p. 414) explain "resulted from concern that existing legislation and regulation dealing with the ocean domain did not provide an 'integrated' or 'holistic' approach." However, after years of development and consultation, the policy development process was suspended due to the furore over the growing debate regarding the foreshore and seabed (Vince & Haward, 2008). While development was restarted in 2005, no substantive policy integration has occurred yet. McGinnis (2012) recommends that regional councils develop integrated marine plans for areas where conflict between users and their ecosystems are likely to develop in the future. Second, the report recommends the adoption of a new role for central government to support an ecosystem-based approach to integrative marine planning and decision-making. Furthermore, he notes that within central government "stronger interagency coordination and new public policy are needed to address future marine resource conflicts and to support an ecosystem-based approach to integrative marine planning and collaborative decision making for the EEZ" (McGinnis, 2012, p. 8). The RMA serves as a good model of integrative policy, it saw "700 statutory bodies in such diverse areas as harbour management trusts and drainage boards abolished, and 167 separate pieces of legislation revoked" (Vince & Haward, 2008, p. 414).

Collaboration and cooperation

Another critical way in which fragmentation can be overcome is increased collaboration and cooperation across the Māori fisheries sphere. Joseph et al. (2016) conducted a comprehensive assessment of collaboration in the Māori sector, providing a rich resource. They have summarised their findings in a table that outlines the reasons for collaborating, the types of collaboration and the necessary components (see p48, Note: Pare Consulting (2016), cited in Joseph et al. (2016, p. 30).

Figure 3. *Reasons for collaborating in the Māori fisheries sector*



Note: Pare Consulting (2016), cited in Joseph et al. (2016, p. 30).

Bess (2006, p. 374) similarly notes that "[i]nter-firm cooperation comprises various tangible and intangible resources brought together through firms' efforts to create shared activities or operations that result in mutual benefit." He (Bess, 2006, p. 374) outlines that there "are ample reasons for firms to consider inter-firm cooperation, such as increased competitive pressures, unfavourable market conditions and the acknowledged benefits of past efforts."

Collaboration is "identified as a key element of success in Māori economic development" (Joseph et al., 2016, p. 24). Across the marine space, collaboration could help Māori with both quota fragmentation, as well as governance and management issues emerging from the fractured regulatory and jurisdictional framework. A key way of overcoming the quota fragmentation is to adopt collective structures that pool quota into economically viable amounts. Memon and Kirk (2011, p. 111) identify this as a possible solution. They (Memon & Kirk, 2011, p. 111) also note that "TOKM, for instance, have been advocating that collaboration between iwi is a crucial issue, as well as encouraging discussion between iwi within Fisheries Management Areas." Also, the "Ministry of Fisheries… has argued that 'strengthening Maori collective management arrangements' remains an important and vital goal of the Crown" (Memon & Kirk, 2011, p. 111). Dodson (2014, p. 526) makes the point that "[r]ecent Treaty of Waitangi settlement negotiations have resulted in innovative collaborative frameworks for managing specific natural resources or areas." This serves as a reminder that these collaborative structures can be either encouraged or discouraged through legislative changes.

Joint ventures offer a relatively targeted and easy to set up form of collaboration, involving a business arrangement in which two or more parties agree to pool their resources for the purpose of accomplishing a specific task, as the venture is its own entity, separate from the participants' other business interests. As

Memon and Kirk (2011, p. 111) explain,"finance gained from joint ventures can allow Maori-owned fishing companies to become embedded within regional economies and local communities, as well as globally within international trade and investment networks." Norman (2016, p. 2) does warn that "more joint venture processing facilities across firms to improve efficiency" may occur due to industry consolidation, though for Māori there is a need to overcome fragmentation that this consolidation could improve.

There are many fisheries cooperatives around the world. As Ovando et al. (2013, p. 133) explain "fishery cooperatives vary considerably in structure and function, the working definition adopted for this study is an institution in which groups of fishers or other interested parties act collectively to manage some aspect of a fishery." There is, then, a fair amount of latitude for the concept of a 'fishery cooperative'. Ovando et al. (2013, p. 134) provide a list of cooperative categories, which they grouped into four types of cooperative behaviours: non-management actions; catch and effort management; coordination and policing; and stewardship actions.

De Alessi et al. (2014, p. 218), in a piece discussing the growth in cooperatives in the US fishing sector, explain that:

> Cooperatives form when a group of vessels or quota owners reach a contractual agreement to share resources, rules, and enforcement mechanisms. Cooperatives may manage internal quota allocations and transfers, negotiate prices with processors, manage bycatch and sideboard limits, and/or create risk pools to mitigate prohibited species catch (PSC) restrictions. The size and scope of cooperatives are largely determined by the legal, social, and economic hurdles to reaching agreements, described by institutional economists as transaction costs.

In terms of transaction costs for fishing companies, they explain that:

> Aggregating information and managing cooperative operations on a day-to-day basis are other examples of transaction costs. Factors such as a large or heterogeneous number of participants raise transaction costs (make agreement more difficult); sector allocations (reducing heterogeneity) and at-sea processing (where harvesting and processing occur within the same organization) reduce them" (De Alessi et al., 2014, p. 218).

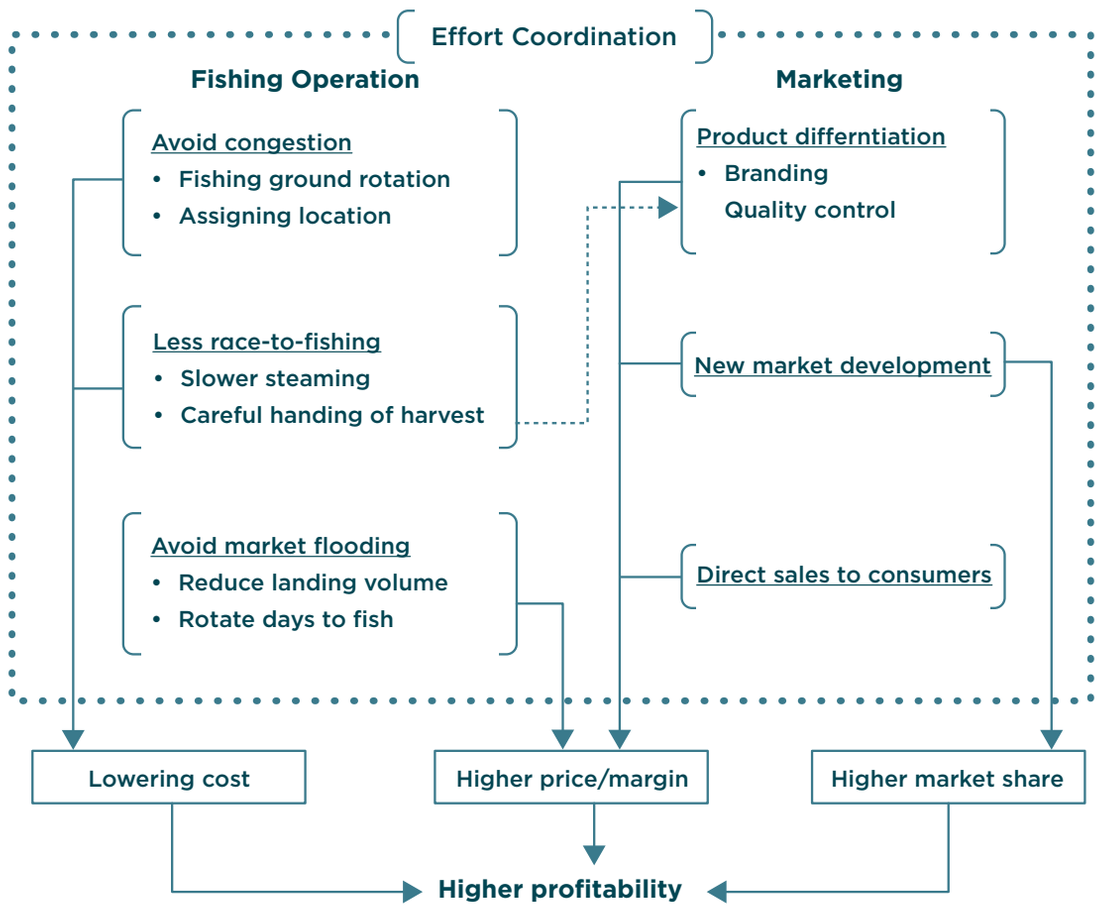
"Cooperatives", as De Alessi et al. (2014, p. 222) explain "have changed the economics of fishing, generating wealth by reducing capacity and waste and by managing external harvest limits on both targeted and prohibited species." Cooperatives enable the fishing industry to "move away from maximizing harvests or individual profits toward collectively maximizing profit from the fishery as a whole" (De Alessi et al., 2014, p. 222-223). Fishery cooperatives are also able to help resolve a wide range of fishery management problems, improve economic conditions, and simultaneously achieve conservation benefits (Ovando et al., 2013). In the US, "[s]ince 1997, the proportion of the total allowable catch (TAC) in the fisheries of the West Coast of the United States harvested by cooperatives and other catch share arrangements has risen from 0% to almost 60%" (De Alessi et al., 2014, p. 218).

Table 1. *Cooperative behaviour*

Cooperative behaviour	Description
Marketing	Cooperation to collectively market or brand catch
Proceed sharing	Pooling system to distribute proceeds from fishing among fishery members
Coordinated harvesting	Coordination of fishing strategy among fishery members
Catch limits	Implementation of self-imposed catch limits above and beyond any similar governmental restrictions
Gear restrictions	Implementation of gear restrictions, e.g. the prohibition of dynamite, beyond any similar governmental regulations
Size limit	Implementation of self-imposed size limits above and beyond any similar governmental regulations
Gear sharing	Collective ownership or use of fishing gear, such as boats, nets, or landing facilities
Direct enforcement	Collective action to physically enforce fishery regulations, for example organization of patrols
Codified penalties	Collectively determined set of defined penalties for infractions of fishery regulations
Temporal restrictions	Voluntary cessation or restriction of fishing activities for the fishery as a whole, or for a defined spatial region, for a given period of time
Spatial marine protected areas	Voluntary closure or restriction of spatially defined portions of the fishery
Restocking	Collective action to restock the fishery, for example through the seeding of juveniles
Habitat restoration	Voluntary efforts to restore fishery habitat, for example planting of mangroves
Gear shift	Collective choice to switch to more environmentally friendly gear types
By-catch avoidance	Cooperative actions to reduce by-catch above and beyond any government stipulations
Research support	Cooperative support of fishery research activities, such as data collection or science funding

Note: Ovando et al. (2013, p. 134).

Figure 4. *Fishing coordination and profitability*



Note: Uchida. (2017, p. 89).

Uchida (2017, p. 89) above, provides a flowchart on how fishing effort coordination by the cooperative members can lead to higher profitability. Coordinated activities can be divided into two categories: increasing efficiency of fishing operations, and increasing the value and presence in the market through marketing activities. Each activity can lead to lowering fishing cost, increase market price, and/or increased market share, which could yield higher profit from harvested fish. As Uchida (2017, p. 89) explains, "Marketing activities include, but are not limited to, direct sales, product differentiation/branding, and cultivating new markets. Direct sales are expected to increase the profit margin by skipping the middlemen to deliver seafood to consumers and other end users." This is shown in Figure 4 above (Note: Uchida. (2017, p. 89).

The Iwi Collective Partnership (ICP) is one of the key examples of this collective structure. ICP began operating in 2007 as an unincorporated collective of iwi fishing interests, before incorporating as a limited partnership in 2010. As Joseph et al. (2016, p. 96) explain, bringing the ICP together required "a collective pragmatic and strong vision... and much voluntary work was invested initially to bring the groups together which was carried out by some of the ICP

leaders." Joseph et al. (2020, p. 103) also note that geographical proximity provided a useful base upon which to collaborate, particularly as it denotes a degree of shared history and similar tikanga. Prior to collaboration, most ICP members had multi-year ACE supply agreements with various fishing companies, mainly AFL and Sealord, for a term of three years. The number of participating iwi has grown from 12 to 19. The ICP Board has six directors elected and appointed by the iwi shareholders (Castle, 2015). Three directors are appointed by the three largest iwi shareholders; three directors are elected by the remaining nine shareholders. This is to provide security for the larger partners but also an opportunity for participation by smaller partners. ICP is "increasing its membership to other iwi who can add value and who accept the values of transparency, integrity, respect and trust" (Castle, 2015, p. 53). The ICP was formed as a means for its constituent iwi to become more active in fishing. The benefits of the ICP to individual iwi membership include (Joseph, 2016, p. 95):

- Building economies of scale through the collectivisation of iwi ACE
- Pursuing optimal returns on ACE
- Creating opportunities that build iwi member capacity, capability and participation within the fisheries sector
- Improving understanding and capacity to manage risk
- Promoting kaitiakitanga and sustainable practices within fisheries
- Improving business performance through developing a strategic direction that is realistic, logical, and achievable
- Sharing knowledge and experience among iwi members through tuakana – teina principles
- Attracting fisheries investment opportunities and
- Attracting opportunities for iwi members to advance participation within the fisheries value chain

The ACE has been separated into specific parcels – inshore, deepwater, and koura quota – and "committed these parcels to strategic partners it believes would add value to its returns and potential opportunities long term" (Castle, 2015, p. 55). ICP has entered into joint ventures with a several strategic partners including Pelco, Sanford, and Aotearoa Fisheries Limited. ICP also provides scholarships, seafood training grants, iwi development funding, and customary fisheries initiatives. As Joseph et al. (2016, p. 96) explain:

> ICP encourages further collaboration opportunities with other iwi who can add value and who themselves appreciate transparency, integrity, respect and trust. In this respect, ICP members are willing share and exchange their expertise among themselves to assist each other to collaborate, govern and manage their assets more effectively.

As member group Ngāti Porou Seafoods Group (2015, para. 2) explains:

> Before the Iwi Collective Partnership Māori fishing interests were fragmented and did not have the structure to develop commercial opportunities – we were followers and price takers with little commercial influence. In partnership we have achieved a great deal in a relatively short time.

Joseph et al. (2016, p. 96) found a number of key aspects that have made ICP successful, including "the importance of maintaining a long term, intergenerational view of the ICP, promoting good relationships through being transparent and accountable, maintaining exceptional and constant communication among the ICP iwi leaders, and building and maintaining trust among the partners." They also found that "the level of leadership required to bring the collaboration together… was post-Treaty of Waitangi settlement asset holding company level and not the mandated Iwi organisation (MIO) level." As they (Joseph et al., 2016, p. 96) note, the reason for this was "the MIOs are highly politicized while the asset holding company is about focusing on getting on with the business rather than the politics of commercial fishing hence a commercial and pragmatic, rather than political and perhaps conservative, mindset prevailed." ICP have also developed a dispute resolution technique, based on tikanga, with kanohi ki te kanohi in a marae setting, with ICP partners rather than a third party moderating the debate (Joseph et al., 2016). As Joseph et al. (2016, p. 96) explain, "collaboration models ought to include dispute resolution processes when differences of opinion inevitably arise between partners."

Another example of a collective partnership, one that ICP is itself a member of, is Port Nicholson Fisheries. In reference to quota fragmentation, Tuuta (N.D., as cited in Pankhurst, 2018, para. 11–12) explains that "[a] way of overcoming that was the example set by Port Nicholson Fisheries, a crayfish collective of over 30 iwi. The company had signed an agreement with Ngāi Tahu Seafoods which would see them collectively market and export around 1000 tonnes of rock lobster, making it Aotearoa New Zealand's largest live exporter. The largest participant in this collective had around 400 tonnes of lobster quota. The smallest has just 69kgs. "This was achieved in six years and if it can be done in crayfish, surely it can be done in other species," Tuuta (N.D., cited in Seafood New Zealand 2018, para. 14) said, "The reality is that we all have to support one another and find co-operative models and courageous leadership which brings us all together if we truly wish to lead."

As Bryden & Dana (2011, p. 214-215) explain:

> Comparing both firms reveals that ownership structure did have a significant impact on the degree of internationalisation. This is in accordance with the literature on family ownership, and the decreased ability to source financial resources that may be required to enter foreign markets. Sealord has a much larger presence overseas, with established joint ventures and many international offices. Fifteen percent of its production is sourced offshore, in comparison to Talley's 3%. The main obstacle facing Sealord (in terms of internationalisation) is getting a sufficient supply to bring to the market, which has been the main incentive in setting up international alliances, to source alternative seafood supply. Talley's main obstacle is financial in nature and includes the ability to access markets at the price level given New Zealand's currency and competition from other suppliers.

Aquaculture

Aquaculture is a sector in which collaboration is critical, largely because it is capital intensive and requires long term commitment. Unsurprisingly, there are a number of collaborative structures in place across the industry already. In particular, these collaborations occur between businesses with various research and funding stakeholders such as Crown Research Institutes and other government agencies. As MfE (2007, p. 71) explains:

> The growth of the New Zealand aquaculture industry has resulted in the development of a range of supporting capabilities. Crown Research Institutes, universities and private sector researchers undertake Research & Development for aquaculture production and processing technologies and the sustainability of aquaculture in coastal marine environments. Ongoing R&D focuses on increasing productivity and product value and studying aquaculture activities in their environmental context. Industry training is supported directly by the Seafood Industry Training Organisation, and tertiary institutions around the country offer marine science degrees with an aquaculture flavour. A new aquaculture research and education facility at the Mahurangi Technical Institute in Warkworth was opened recently. Aquaculture has also attracted supporting commercial interests, including engineering firms developing aquaculture structures and equipment and the long-established presence of a major international marine and aquaculture insurer in Nelson. There is a substantial history of sector organisation at the species and regional level in New Zealand aquaculture dating back to the 1970s. Established groups include the New Zealand Mussel Industry Council, New Zealand Oyster Farmers Association, New Zealand Marine Farmers Association and Coromandel Marine Farmers Association. Industry participants report strongly aligned incentives and steadily improving cooperation throughout the industry, culminating in the recent development of a sectorwide strategy and industry body, Aquaculture New Zealand.

Still, more could be done to encourage intra-industry collaboration, particularly between businesses, within regions, and between iwi. In the new frontier of open ocean aquaculture, which is capital intensive, the need to form collaborative structures is even more important. As Wattie (2021, p. 20) explains in his review of the potential for open ocean salmon farming: “The New Zealand industry will likely be made up of several small participants, by global standards. Benefits could accrue to the industry by participants taking a collaborative approach to those components of the value chain that offer scale advantages.”

In a speech to the regional Aquaculture Forums, Minister Mallard (2006) noted that:

> Regional partnerships are particularly important. The region is where the planning and strategic thinking on aquaculture happens. It is also where industry and community interests of various kinds meet and too often lock horns. In some cases, it is the place where good proposals founder and die.

While it is not a surprising statement at a regional forum, as will be outlined later in the section on cluster development, regional collaboration is a critical component in success in the marine sector.

Many Māori collectives and businesses in particular can benefit from sector collaboration. As a report on iwi aquaculture

in the Bay of Plenty explains, "Māori Aquaculture in the Bay of Plenty can harness the power in Iwi working together at an appropriate regional level to maximise the benefits of aquaculture settlement assets" (EnviroStrat, 2020, p. 12). Ngā Iwi i te Rohe o Te Waiāriki are working in partnership with the Ministry for Primary Industries and Te Ohu Kaimoana, to collectively explore opportunities to enable the development of Māori aquaculture in the Bay of Plenty (EnviroStrat, 2020). As the EnviroStrat (2020, p. 7-8) report notes, collaboration is a critical component of successfully developing an aquaculture operation for Māori: "partnerships with academic and research institutes offer powerful opportunity to grow Māori careers in aquaculture and drive success."

Co-governance and co-management

One set of solutions for overcoming the fragmentation is through co-governance and co-management structures. One of the most promising areas of co-management in the marine space is EBM. The current EBM conception of the Sustainable Seas Challenge includes "a co-governance and co-design structure that recognises the Māori constitutional relationship and mana whenua at all levels (whānau, hapū, iwi), together with the guiding principles of mauri, whakapapa, kaitiakitanga, mātauranga-a-iwi and mātauranga-a-hapū" (Joseph et al., 2018, p. 2).

In some ways the QMS brought about "the redefinition of the Maori fisheries rights and new governance spaces for Maori to exercise these rights" (Memon & Kirk, 2011, p. 109). The neoliberal approach to fisheries can create "potential 'space' for community participation in natural resource governance" (Memon & Kirk, 2011, p. 109). "Arguably," Memon and Kirk (2011, p. 109) continue, "the QMS has opened up innovative new governance spaces for Maori to own and manage their fishery resources in collectives or at the iwi and hapu levels." They (Memon & Kirk, 2011, p. 111) note that "redefinition of property rights has allowed Maori to gain a governance space in commercial fisheries, as seen in the ownership of large seafood exporters such as the AFL."

Maxwell et al. (2020, pp. 1-2) explain that to "approach the issue of marine governance through an Indigenous lens and acknowledge that a reconciliation process (the Waka Taurua [a metaphorical framework for facilitating the development of collaborative initiatives]) is required for a truly integrated and co-management approach that New Zealand aspires to and not one that merely co-opts Indigenous knowledge." As Maxwell et al. (2020, p. 7) identify, there is a need "to build positive relationships between government agencies and Māori based on trust and understanding, rather than a relationship based on merely fulfilling legislative requirement." Part of this, Maxwell et al. (2020, p. 7) believe, is "a bottom-up approach to engage in a genuine co-governance or co-management regime" including having "dedicated Māori representatives on co-governance institutions." "Key to the success of

co-management approaches", they (Maxwell et al., 2020, p. 7) also note, "is ensuring that Māori and government agencies share a common purpose for marine management."

These co-governance and co-management structures can also help with the commercial collaborations outlined in the section above. As TOKM (2018, p. 4) explains:

> A key to the further development of commercial co-operation within the sphere of the Fisheries Settlement is the establishment of more direct governance arrangements over Aotearoa Fisheries (and Sealord) by their iwi shareholders. The need for such governance adjustments to both Aotearoa Fisheries Limited and Te Ohu Kaimoana were the central findings of the 10-year statutory review of Fisheries Settlement structures. The main thing Parliament can do to reinforce this very positive cooperative trend is therefore to pass those revisions to the Māori Fisheries Act recommended by the Review (February, 2015) that are strongly supported by iwi.

These co-governance and co-management structures would need to match traditional cultural structures to some degree. As Dodson (2014, p. 533) notes, "the activation of local leadership, based on culturally authentic structures of authority and legitimacy, is fundamental to partnership establishment and effectiveness." These local partners can provide "the moral, culturally appropriate leadership and legitimacy required when engaging at a local level" (Dodson, 2014, p. 533). However, while traditional structures would need to be respected and reflected, as the issues between urban Māori and tribal groups that plagued the settlement process suggests, contemporary organisational structures would also need to be considered both for match with broader national trends and to match contemporary Māori organisational diversity.

Trading mechanisms

Individual transferable quota is able to be traded while SET quota has much more severe restrictions. As outlined, these restrictions were put in place to prevent alienation of Māori fisheries taonga, with lessons from Māori land loss guiding these decisions. While other solutions, such as collaborative business structures, might be able to help Māori authorities overcome quota fragmentation, it also pays to explore possible trading mechanisms that still protect SET quota whilst enabling quota consolidation. Yandle and Dewees (2008) describe how trading and balancing mechanisms are used across a variety of domains and sectors including air pollution, climate change, water pollution, wildlife management, tire recycling, and water use. As a product of this feverish spread of tradable quotas across diverse arenas of human affairs and resource management, there are a number of different trading mechanisms available. While there are many different trading mechanisms available, a brief summary of those provided in the literature will be outlined.

Trading/balancing mechanisms

Yandle and Dewees (2008) identify trading and balancing mechanisms, explaining that these are used across a variety of domains

and sectors including air pollution, climate change, water pollution, wildlife management, tire recycling, and water use. Sanchirico et al. (2006, p. 767) identify a possible mechanism that could be used by Māori:

> Management systems permit ''retrospective balancing'' or trades after landings are made to allow a fisherman to cover overharvest of quota. Managers also have used non-trading mechanisms to aid in balancing catches with quota holdings. These include rollover provisions, such as carrying forward or back of quota, ''deemed value payments,'' under which fishers are charged a fee for each unit of catch they land above their quota, or permitting fishers to surrender or discard catch they cannot match with quota. Some programs also permit ''cross-species'' exchanges where quota of one species can be used to cover catches of another species at a prescribed trading ratio.

As they (Sanchirico et al., 2006, p. 768) continue:

> All of these mechanisms introduce flexibility into the system for the benefit of the individual quota owner. The costs of this additional flexibility, however, can be a loss of precision in TAC management, potential effects on the performance of the lease market, and a greater administrative burden. If two species in a multispecies complex have TACs that are out of balance with average catch ratios, the non-trading instruments might enable fishers to more fully utilize the TAC of the species that would otherwise have been constrained by the TAC of the jointly caught species. Flexibility mechanisms can, therefore, increase the value generated by the multispecies complex, but they also can increase the risk of over exploitation.

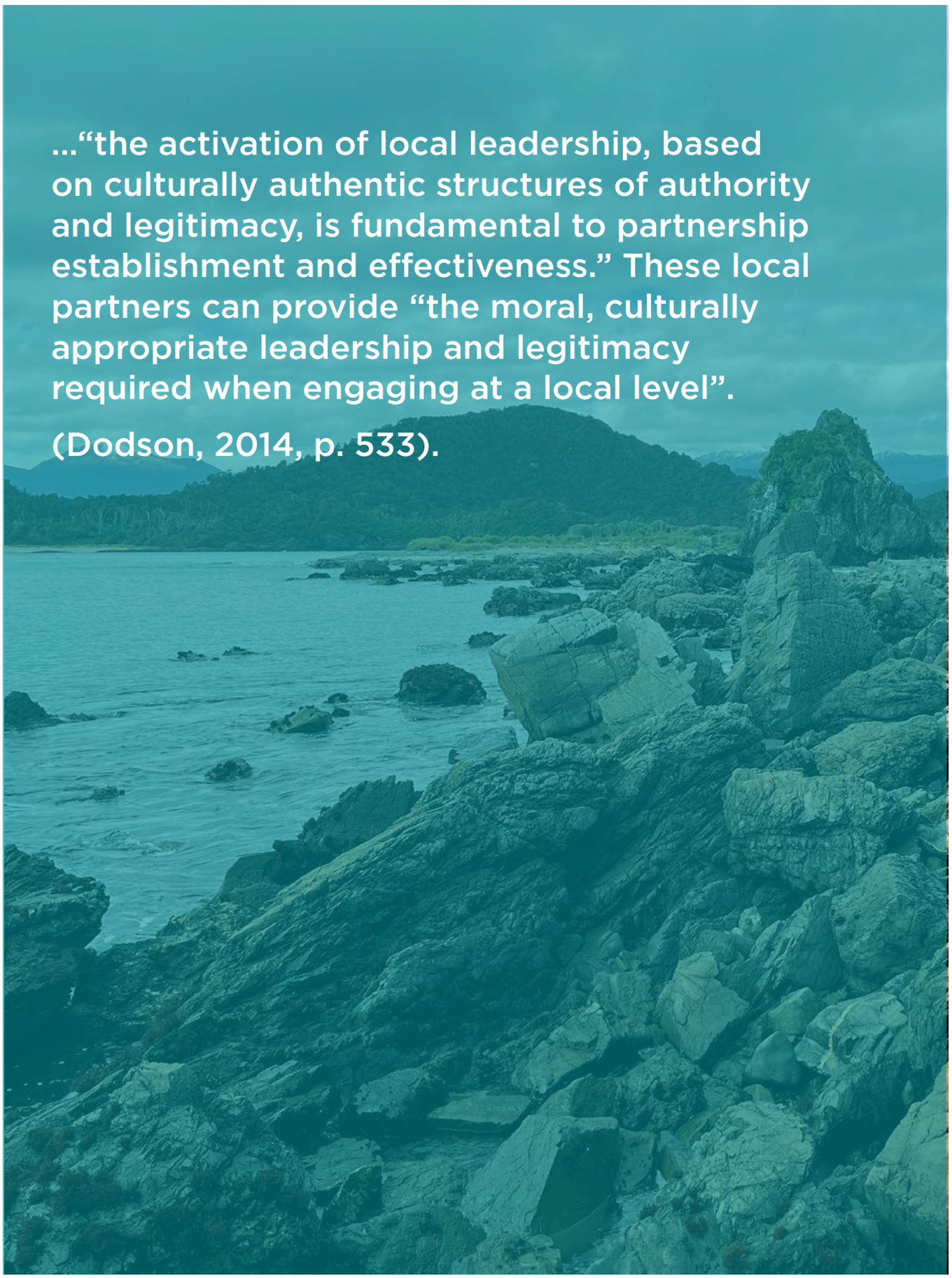
Quota markets

Another possible solution is quota markets, which are already in place in Aotearoa New Zealand, though they could do with improvement. As Sanchirico et al. (2006, p. 772-773) explain:

> When quota owners have portfolios of annual quota (or ACE) that, on average, balance with expected catch composition, then trading of ACE between fishermen should enable reallocations over the year such that ACE balances against catch in the aggregate. Markets for ACE are, therefore, an important mechanism for accommodating imbalances between fishermen's catches and their annual quota… Other common restrictions are allowing trades only within a pre-specified market (area–species combinations), limits on the share of quota ownership, and requirements that trading partners must be members of the same fleet.

Sanchirico et al. (2006, p. 772-773) continue, noting that:

> Iceland and New Zealand both have established central trading exchanges. New Zealand managers have experimented with two centralized quota-trading exchanges over time. The first, created by the New Zealand Legislature alongside the QMS, included fish brokers and a trading information exchange but never materialized and was closed down shortly after the QMS system was implemented. In 2004, an online auction system for annual quota (or ACE) (www.acetrader.maori.nz) was created. The system has achieved limited success to date.



…“the activation of local leadership, based on culturally authentic structures of authority and legitimacy, is fundamental to partnership establishment and effectiveness.” These local partners can provide “the moral, culturally appropriate leadership and legitimacy required when engaging at a local level”.

(Dodson, 2014, p. 533).

Rollover allowance

Another possible solution is rollover allowance. As Sanchirico et al. (2006, pp. 774–775) note:

> Rollover allowances permit operators either to carryforward unused quota for use in the following year or carry-back or deduct from the next year's allocation an overharvest of the current quota. Each of the programs allow some form of rollover, but none allow the quota to be carried over multiple years, which would permit the accumulation of banked quota for use in future periods.

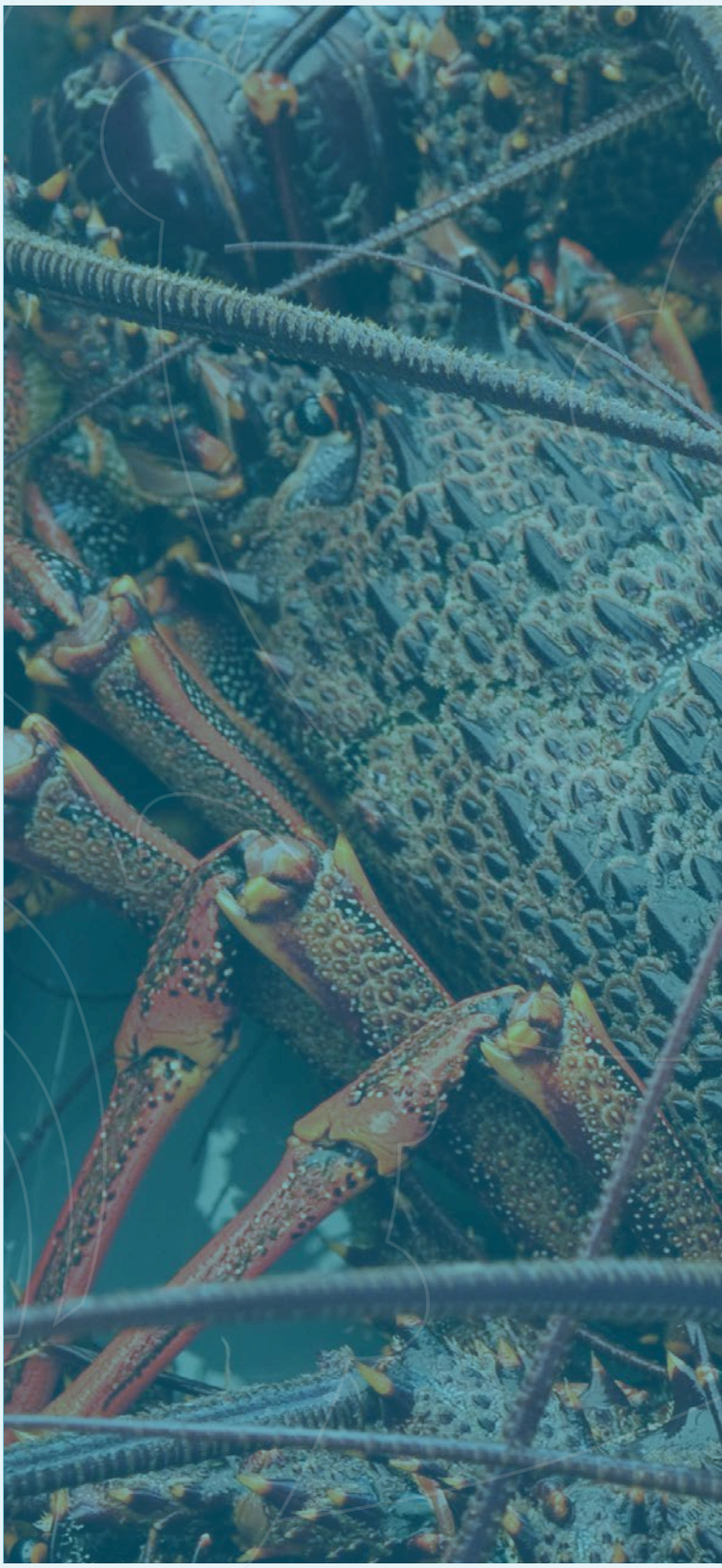
Species quota exchanges

Sanchirico et al. (2006, pp. 775–776) also highlight the role of species quota exchanges:

> Species quota exchanges permit fishermen to cover catch of one species with quota of another at a pre-specified trading ratio… A disadvantage of species exchanges (similar to deemed value payments) is that the aggregate catch of each species is uncertain. The possibility that TACs will be exceeded depends on the relationship of relative catches and TACs of exchangeable species… Iceland is the leader in using species exchanges. Under its system, quota shares are put into cod equivalents or a cod currency.41 Limits, however, constrain the conversion of ACE among species. Specifically, quota owners can convert cod to other demersal species and make conversions among the other demersal species, but demersal species other than cod cannot be converted into cod. In addition, owners cannot convert more than five percent of their total ACE in 'cod equivalent' units, and no more than two percent of their ACE can be converted into any one species. These restrictions attempt to reduce the possibility for large overruns of TACs in any given year. Very sophisticated web-based catch-balancing data collection and real-time updating of catches has helped to reduce the administration costs of the species trade-off system in Iceland… Similar to the deemed value system, where the use depends on the deemed value charged for quota, the use of the 'species exchanges' greatly depends on the exchange rates between species quota. Cod equivalence rates have changed over time and are calculated based on the relative value of the different species… Between, 1990 and, 2001, New Zealand included a system similar to Iceland's cod equivalents. The bycatch trade-off scheme allowed limited trading of quota of certain species against quota of other species. Each year the program was in operation, specific bycatch and target stocks would be listed with the rates at which they could be traded. The scheme allowed a fisherman who landed the bycatch stock for which he had insufficient quota to trade off quota for the target stock at a specified rate on the condition that the bycatch was taken while fishing for that target species. The trading ratios were specific to each bycatch and target species. That is, elephant fish (area 3) could be traded at one ratio with red cod (area 3) and at another with flatfish (area 3). Over the course of the program, 30 fish stocks were denoted target species, 46 were denoted bycatch, and 6 were denoted both bycatch and target. Unlike in Iceland, where quota could not be converted into cod, often a species would be classified as bycatch in one quota management area and as a target species in another quota management area.

2. Auahatanga—Differentiation

Wild fisheries are profitable, with export volumes increasing by 0.2% per annum (Inns, 2013). There is little room for volume growth, however, instead operational and supply-chain improvements, diversification, and innovations are required to add value (MPI, 2019a). Māori enterprises generally operate in the volume and commodity space, following low-cost strategies rather than high-value and product differentiation. There is a trend of moving from species to species as stock levels drop. Further, there is a strong trend of consolidating investment in higher value export species (kōura, pāua, snapper, and hoki) that are vulnerable to overfishing and climate change. This poses significant commercial risk to the Māori marine economy. Similarly, aquaculture is focused on a small range of commercially-proven species vulnerable to climate change including green-lipped mussels, salmon, and pāua. There is significant emphasis by Māori on conventional fisheries, aquaculture, and tourism initiatives, arguably at the expense of novel marine economy options that present sustainable economic opportunities.



While performing well commercially, Māori have generally been conventional and conservative in their approach, with some exceptions. Although more recently effort has been made to add value through Indigenous branding and the values-centred business practice, further research is needed to support differentiation. This research theme aims to support the differentiation of Māori seafood products and Māori enterprise initiatives in the marine economy. This section will first outline the causes of consolidation and explore solutions that can deliver differentiation.


Auahatanga (differentiation) — differentiating kaitiaki generated products from commodities and diversifying Māori activity in the marine economy.

The goal of the indigenising the blue economy research is to partner with Māori authorities (iwi and pan-iwi entities and Māori enterprises) to explore and to support Māori who aspire to a blue economy imbued with mātauranga, Treaty principles, and a focus on Māori wellbeing, human potential and relational balance with Tangaroa as our tīpuna.

2.1 Challenges

Quota management system

The QMS was lauded for its economic outcomes originally, with emphasis on how "issues of allocation, equity and industrial performance were effectively addressed through the QMS/ITQ regime; the fisheries were well managed; and the policies resulted in economic growth" (Winder, 2018, p. 77). However, as Winder (2018, p. 78) explains, Aotearoa New Zealand's "fisheries, aquaculture and seafood sector is now assessed as showing lackluster performance, compromised by lack of attention to added value and marketing, changed currency relativities, and an inability to source more and higher quality resources." The QMS has become increasingly complex and unwieldy over time as layers of new regulations and rules have been added, whilst at the same time the original efficiencies of placing fishing into a 'market' management mechanism have been lost. As Torkington (2016, p. 180) explains, the "QMS is based on market logic, and with it the government created a market (albeit not a free market) to govern access to fishery resources." In turn, Torkington (2016, p. 180) continues the "state was transitioned from being a game-keeper of the resource and day-to-day manager of the industry to that of policy and management advisor." Torkington (2016, p. 180) concludes:

> I argue that rather than creating a competitive market, the idea enshrined in the political rhetoric of deregulation and increased competitiveness of the day, the QMS institutionalized a rent-based fisheries sector. Quota was assigned, not by market forces, but through catch-history. Effectively, bulk catching low value fishing was granted the largest perpetual rights (individual transfer quota (ITQ)) while low catch high value firms received minimal ITQ, and lacking the ability to raise capital for expansion simply exited the industry.

McCormack (2018, p. 283) also criticises the impact of the market as a fisheries management mechanism, though her insight is different to Torkington's:

> [M]ore wealth can be generated from trading activities than chasing fish in the sea. Therefore, in many ways, transferability is not about fish in the sea. It concerns, rather, the emergence of virtual fish and the attendant relegation of labour as now inconsequential in generating wealth. It elevates the status of quota traders and brokers while devaluing the knowledge associated with harvesting.

Likewise, Walshe (2010, p. 67), referring to two independent reports of the QMS done in the 1990s, notes that "both identified the excessive use of regulation in New Zealand fisheries, and the impediments they created for a market-based approach." As a result, TOKM (2018, p. 3) explains:

> Financial returns from Individual Transferable Quota ownership have fallen as a percentage of quota value since, 2004, reflecting generally falling interest rates in New Zealand over that period. Yields on quota are now around 6% per annum and the Māori fishing asset returns approximately $60m per year (around $100 per Māori).

Norman (2016, p. 7) identifies one area that has countered this trend: "Considering export growth in US dollars by sub-category, the one area in which New Zealand has excelled is in crustaceans. New Zealand exports surged 243% in 14 years compared to world crustacean export growth of 115%."

While not all aspects of convention and commodification can be laid at the QMS it certainly plays a significant role. There are several areas where this can be seen, including wild capture limits and industry consolidation.

Wild capture limits

The QMS places set limits on the amount of wild fish able to be harvested every year. These 'hard limits' on wild capture place a significant constraint on growth in the marine economy, as identified by a number of commentators (Lewis et al., 2020; Norman, 2016). These limits make it difficult for businesses to increase their volume. As Lewis et al. (2020, p. 34) explain, while there "are important differences in cost-structures and future possibilities between inshore and offshore fisheries... volume-led growth appears unlikely." MBIE (2017, p. 5) explains that, "While New Zealand has a large and sustainably managed wild catch fishery, there is little likelihood of significant volume or throughput increases going forward." "Wild capture stalled around 1990," MBIE (2017, p. 12) explains, and as "a result of the stall in wild capture, particularly of marine fish, the global production mix is shifting dramatically to aquaculture production of freshwater fish, aquatic plants and molluscs." Of course, the wild capture limits serve a critical conservation purpose and no sensible recommendation would suggest increasing them significantly. Rather, they are a constraint that requires solutions that add value to the ACE as it stands. Memon and Kirk (2011, p. 111-112) pose a contrary view of the hard limits of the QMS. They believe they offer "a safety of supply Maori commercial fisheries governance through output control and quota that most other major seafood exporters cannot guarantee, giving New Zealand a competitive global edge." This advantage is "further enhanced by... Annual Catch Entitlements, giving quota owners a figure of the set tonnage of fish they are allocated annually" (Memon & Kirk, 2011, p. 112).

Industry consolidation

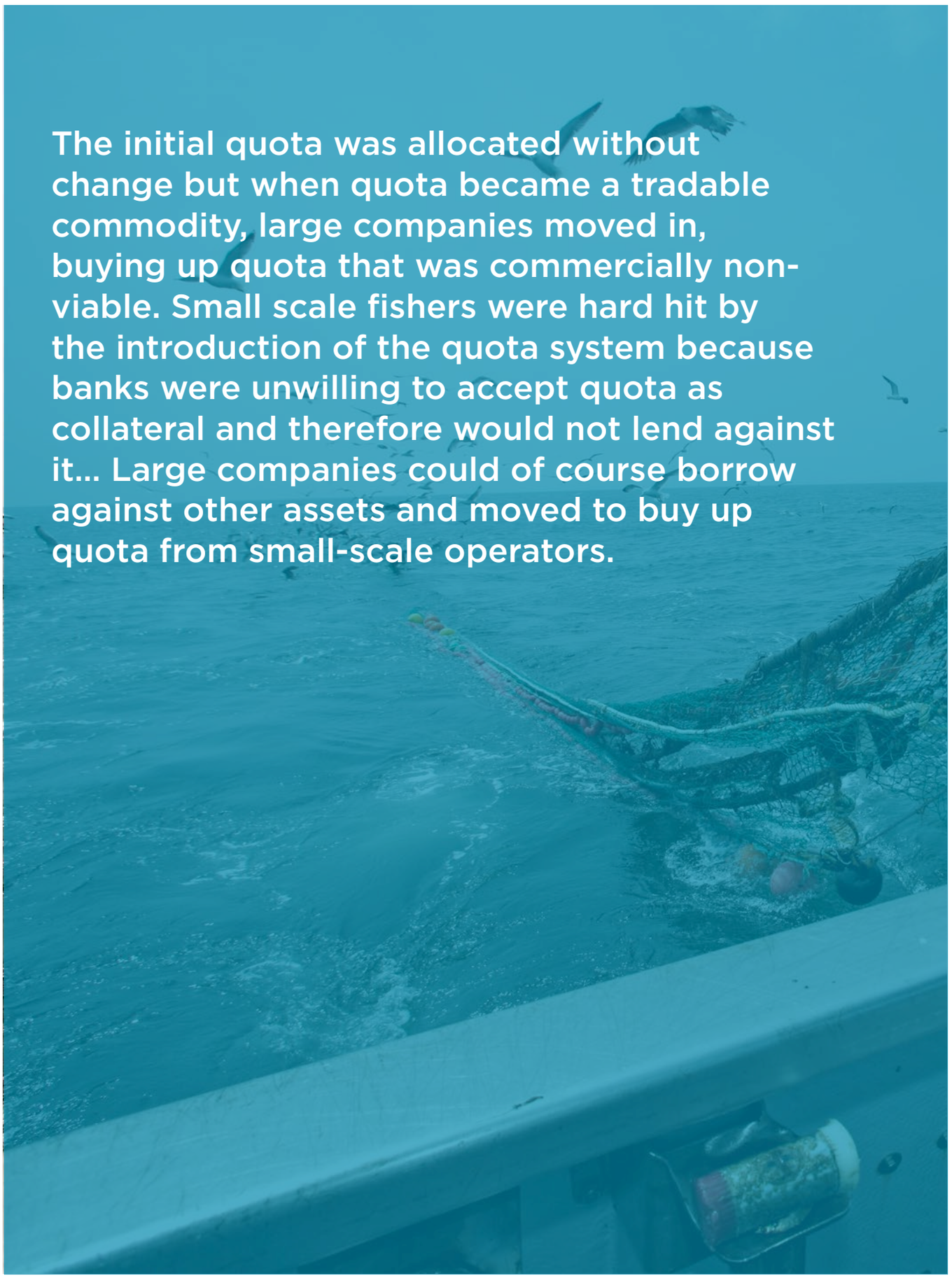
Since the introduction of the QMS there has been an increasing consolidation across the sector, which has led to increasing commodification of fisheries products and has also generated a range of constraints in whakatautika as discussed in that section. In establishing the QMS, the government 'allocated quota to boat owners who declared over 80% of their income from fish sales based on their previous 3 years of catch histories" (Song et al., 2018, p. 289). As Memon and Cullen (1994, pp. 160-161) explain:

> The initial quota was allocated without change but when quota became a tradable commodity, large companies moved in buying up quota that was commercially non-viable. Small scale fishers were hard hit by the introduction of the quota system because banks were unwilling to accept quota as collateral and therefore would not lend against it... Large companies could of course borrow against other assets and moved to buy up quota from small scale operators.

"Most fishers receiving allocations of less than, 20 t per annum sold out to larger corporate actors within 15 years", Torkington

(2016, p. 181) explains, noting that "Many who received small allocations free of cost quickly took the opportunity to cash these out in the quota market. The resulting aggregation of catching rights fuelled a 'race for quota' – prices for popular species rose sharply." The system facilitated 'capital accumulation dynamics' that drove sector consolidation (Song et al., 2018). "As could be expected," Hersoug (2018, p. 103) explains, as "quota values increased over time, quotas were also concentrated to the larger operators." The "port prices for fish fell as competition migrated from competition for fish to competition for quota, and falling prices drove another round of aggregation" (Torkington, 2016, p. 181). "Processors were initially concerned that quota ownership would enable fishers to control processors' access to fish", however, as Song et al. (2018, p. 289) explain because "the system designed with the possibility for non-fishers to own quota, processors were on the docks, 'checkbooks in hand' to purchase quota from fishers." The introduction of ACE drove further consolidation as it "allowed processors to overcome (already generous) quota consolidation limits, further facilitating their consolidation and control over fishers' catches" (Song et al., 2018, p. 289). Consolidation has occurred particularly in deepwater wild capture. MBIE (2017, p. 5) note that, "Wild capture fishing is reasonably consolidated, with a handful of major firms and a range of secondary firms. Consolidation is more pronounced in deepwater fishing, less so in closer waters." Consolidation was further driven by the introduction of "legislation to prohibit commercial fishers (both Maori and non-Maori) from selling their fish to anyone other than a Licensed Fish Receiver [LFR]" (Song et al., 2018, p. 289-290). The reasoning behind this regulation was partly to enhance the government's ability to monitor fish sales to ensure compliance with the quota system. LFR requirements include obtaining land and hiring only certified engineers and builders to build a processing facility (Song et al., 2018). However, as Song et al. (2018, p. 290) explain they "also increased the amount of capital one must obtain to access fish markets, further dampening individual fishers' ability to compete in the current system while giving vertically integrated processors a greater leverage."

Generally speaking, the industry consolidation has been led by vertically integrated fisher-processor operations, who have been able to progressively acquire more quota, which in turn enables them to purchase even more. "In the seafood sector (fishing and aquaculture), the big three firms (Sanford, Talleys and Sealord), together with Moana New Zealand", Lewis et al. (2020, p. 47) outline, "contribute roughly half of total production and revenue." As they (Lewis et al., 2020, p. 47) continue, "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." Processors who own quota have obtained capital to finance further quota purchases, hiring fishers who do not have enough quota and paying them low percentages of the total sale of the fish.



The initial quota was allocated without change but when quota became a tradable commodity, large companies moved in, buying up quota that was commercially non-viable. Small scale fishers were hard hit by the introduction of the quota system because banks were unwilling to accept quota as collateral and therefore would not lend against it... Large companies could of course borrow against other assets and moved to buy up quota from small-scale operators.

These fishers have become what Song et al. (2018) refer to as sharecroppers, locked into a contract where they can only sell fish to the processor who supplied their quota and, thus, unable to negotiate prices. As a result, a diminishing number of fishers own quota. Norman's (2016, p. 2) prediction of the future of the sector is that "Consolidation and automation of the sector will continue." As Norman (2016, p. 2) continues, "Larger players will buy up quotas and look to consolidate operations where possible. The industry structure may be hollowed out such that large processors and small independent fishers dominate."

Globalised commodity economy

The marine economy, and particularly the seafood sector, is a largely commodity-focused export economy (Lewis et al., 2020; Norman, 2016). Most of the products that come from the ocean are traded internationally in either raw or minimally processed form. The Fisheries, Aquaculture and Seafood sector "is now assessed as showing lackluster performance, compromised by lack of attention to value added and marketing, changed currency relativities, and an inability to source more and higher quality resources" (Winder, 2018, p. 78). As Norman (2016, p. 5) explains, "the vast bulk of production from seafood processing is exported (77%). Just 7.7% is bought directly by consumers for consumption, while smaller proportions are used to supply other industries including food and beverage, and accommodation services." "The Fishing, Aquaculture and Seafood sector accounts for just 0.3% of all direct value added in the New Zealand economy," Norman (2016, p. 3) continues. During the 2010s, more than a quarter of Aotearoa New Zealand's seafood exports were in the form of frozen fish (Norman, 2016). Roughly another quarter was in the form of fish fillets, one of the lowest value ways to export seafood (Norman, 2016). Chilled (fresh) fish, one of the highest value ways to export finfish, accounts for just over 8% of exports (Norman, 2016). Roughly three-quarters of the seafood produced in Aotearoa New Zealand is exported and over 50% of this is exported in a raw or minimally processed form, and around another 40% with little added value. However, while the sector is poor at adding value "it plays a far more important role in merchandise export receipts… [with the] vast bulk of value… generated by businesses classifying themselves as processors" (Norman, 2016, p. 3).

Most of the seafood caught in Aotearoa New Zealand is sent offshore to be processed. "Large quantities of New Zealand fish are now processed in China", Winder (2018, p. 84) explains. "During the past 15 years, there has been a substantial increase in the amount of high-volume fish such as hoki exported from New Zealand to China for further value-added processing" (Stringer et al., 2011, p. 162). This is a global trend. "In recent years," Stringer et al. (2011, p. 61) outline, "there has been a significant increase in the amount of fish exported from developed to developing countries for value added processing." The growth in offshore post-harvest processing

is part of the "ongoing globalisation of fisheries value chains and can be likened to developments in other industries over the past decades where manufacturing has shifted to low-cost production sites" (Stringer et al., 2011, p. 161). The need to export is in many ways unavoidable as the cost of production and processing has increased significantly and for many fishing companies to make a profit, they need to send raw product to low cost markets for the final product to be economic (Stringer et al., 2011, p. 161). "The only options for New Zealand companies are to sell the fish in the form that it is landed or look for more efficient processing offshore" (Stringer et al., 2011, p. 166). More directly, as Brydon and Dana (2011, p. 215) explain:

> The nature of the seafood industry in New Zealand has meant that it was not a decision to enter foreign markets, but a necessity, due to the small domestic market, and the capital intensity of the industry, meaning that to reach any sort of economies of scale meant producing more than the domestic market demanded.

Also tying in with the international market and commodities exports is that, "Consolidation at the retail end of the value chain has led to large-scale supermarkets and buying chains having more control of the downstream nodes of the value chain" (Stringer et al., 2011, p. 169). Again, this is an issue that Aotearoa New Zealand exporters across different sectors have faced, with retailers 'wagging the chain' as they grow into global spanning commercial empires. Even within Aotearoa New Zealand, this has become an issue. Foodstuffs NZ announced they would drastically reduce the range of products they stock from Sealord in 2021. The decision, according to an industry spokesperson, "to remove the Sealord frozen ranges as the best example in 20 years of the detrimental impact of the duopoly" (Milne 2021, para. 7). Large retailers and processors are able to essentially dictate the terms, from price to product to presentation, leaving the producer in a position with little to no choice (Stringer et al., 2011).

In some respects, the commodity focus of the seafood sector is an inevitable outcome of the way oceans have been viewed primarily as a resource. This is well captured by Lewis et al. (2020, p. 23) who explain that:

> [The] 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).

Blaming the commodification of the seafood sector solely on the QMS would be inaccurate as the bulk of Aotearoa New Zealand's exports are still sold as commodities. It is a nation-wide rather than sectoral problem. In 1990, value chain proponent Michael Porter was hired by the trade promotion agency to examine Aotearoa New Zealand's economy. The so called Porter Project:

> [V]iewed the seafood industry as another

> example of New Zealand's strong reliance on natural resource commodities that collectively failed to generate the high and increasing levels of income necessary to sustain a high national standard of living. The Porter Project concluded that the seafood industry was structurally unattractive because it was made up of four large and diverse firms, owning the majority of ITQ holdings, and a group of smaller firms (Bess, 2006, p. 370).

Traditionally, Aotearoa New Zealand "agribusiness exports have relied on producing commodities to quality specifications at competitive prices" (McIntyre et al., 2019, p. vii). Between 1995-2011, Aotearoa New Zealand's proportion of value-added exports consumed at their destination fell from 72% to 67% (Farmers Weekly 2016). By 2011 Aotearoa New Zealand's "overall participation in global value chains, as a proportion of total gross exports (33%) [lagged] behind other developed countries (48%)" (Farmers Weekly 2016, para. 6). Brakenridge (2016, as cited in Saunders et al., 2016, p. 5) explains:

> New Zealand must challenge the status quo, blow apart the traditional price-taker mentality and move to a market-shaping model, one where we forgo a volume mentality for a value mindset… we need to transform not what we're selling, but the way we're selling it.

While this is a laudable challenge, most Aotearoa New Zealand companies struggle to even maintain their export-focus, let alone add value. New Zealand Productivity Commission (2021, p. 80) research found that "out of an estimated 4000 firms that attempt to start exporting each year, up to 60% cease after one year. And after seven years, 90% have stopped trading internationally."

This is a nation-wide issue that goes beyond the marine economy. However, the QMS and resulting consolidation in the sector has played a definite role in the lack of value-add in the marine economy. As Hamilton-Hart and Stronger (2016, p. 170) argue:

> The dominance of incumbents with assured profits in the low-value, bulk export of largely unprocessed frozen fish has reduced competitive pressures that might spur innovation and acts as an obstacle to the creation of effective market linkages between smaller-scale fishers and independent buyers of high value, quality fresh fish.

Likewise, Stringer et al. (2011, p. 165) note that the "reduced New Zealand fishing capacity, tighter margins and increased production costs (especially labour) coupled with the development of efficient offshore processing facilities in China has led to significant changes" in the sector, driving a greater focus on commodity supply. They also highlight how decreasing hoki catch has had a spillover effect on the sector, including the selling of vessels and plant closures, which have seen concentration of quota and ACE, further driving a commodity focus. Other critics have also noted the commodity output of the marine economy. Lewis et al. (2020, p. 36) identify how the "Aotearoa New Zealand commodity trap looms… initial gains, falling returns, industry consolidation, lower employment, loss of rents to international owners, and low local multipliers." In this can be seen the role of the QMS, but also a wider cycle driven by the demands of operating in the international market, amongst other

factors. “New Zealand’s marine economy is dominated by commodities” Lewis et al. (2020, p. 78-79) continue, noting that “[o]il, 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.” This is an issue identified by Torkington (2016, p. 180) as well, who notes that “the industry has remained fixated on bulk exports of semi processed fish for further processing elsewhere, often using forced labour. This has occurred at the expense of incentives within the industry to capture more value along the value chain.” While the Māori marine economy is somewhat more advanced in adding value than the wider marine economy, this is still an issue.

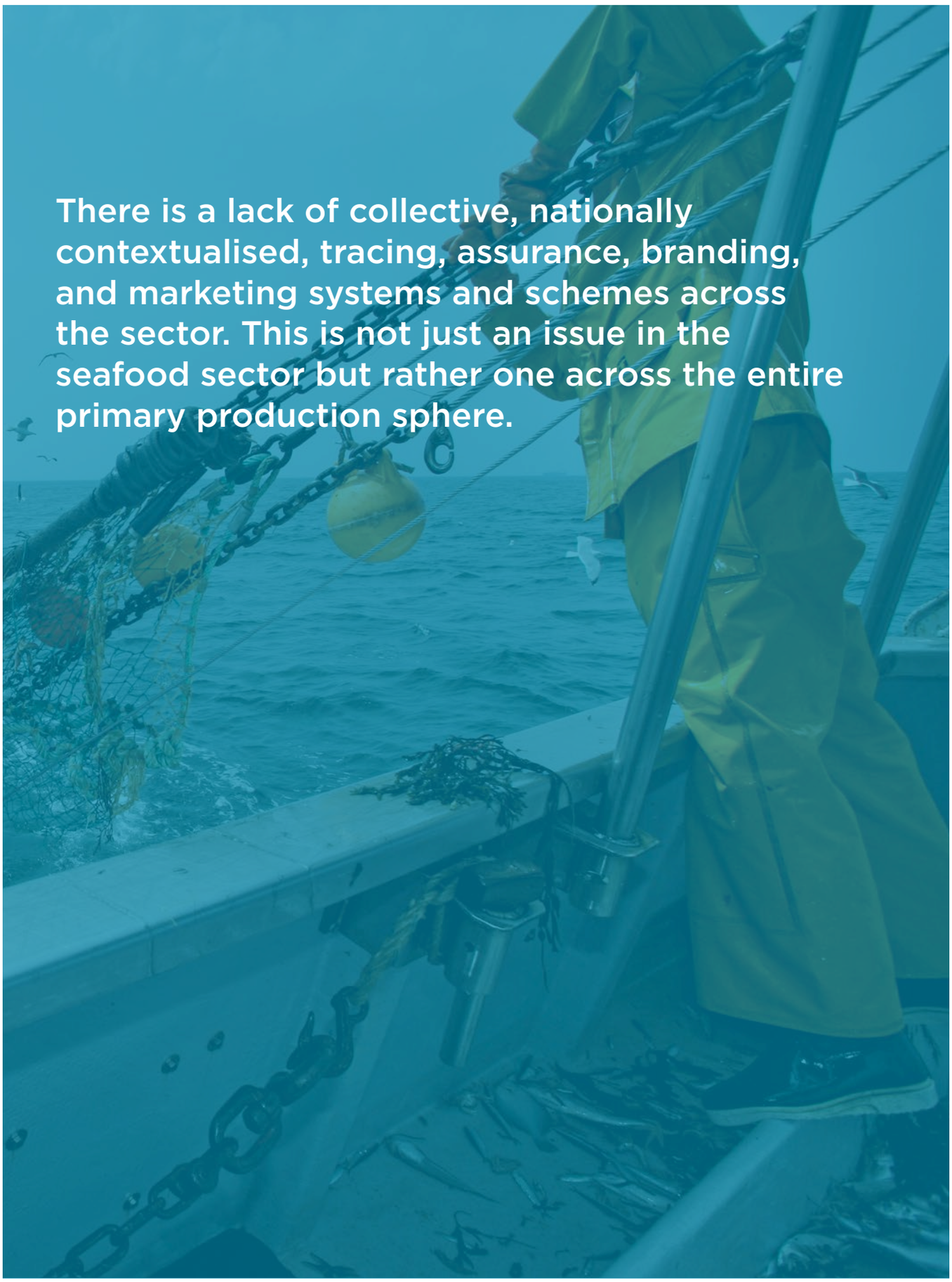
Lewis et al. (2020, p. 80) identify two limits of commodity economies:

> 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.

Tracing, assurance, branding, and marketing

There is a lack of collective tracing, assurance, branding, and marketing (the branding and marketing here refers to a ‘national brand’ that would supplement an individual company’s own brand and relevant marketing) systems and schemes across the seafood sector. This is not just an issue in the seafood sector but rather one across the entire primary production sphere. As the authors of the Koi Tū report indicate in their recent review on the future of food, “New Zealand has a chance to leverage this in developing a national brand that reflects our unique values and culture, our strength as a people, and our deep respect and affection for the environment” (Bardsley et al., 2020, p. 5). This is also reiterated by FarmIQ (2019, para. 9-11):

> We’ve seen the power of national branding before. NZ Tourism has had success on the global stage with its 100% Pure New Zealand marketing, which has been hugely successful in positioning New Zealand as an exciting tourist destination. Why can’t the same logic be applied to our primary industries?
>
> The concept of branding a country for global food export is far from new. The Irish work their ‘Origin Green’ brand hard for the national good. The Australians invest $68m a year in their True Aussie brand which keeps them in the game and we do….very little.
>
> BLNZ [Beef + Lamb New Zealand] recently launched their Taste Pure Nature brand, which is a step in the right direction, but it’s not big, bold or broad enough to do the job we – collectively – need done. We need a national pan sector (dairy, meat, wood) brand campaign that frames New Zealand as a clean, green and sustainable producer of many primary products. With a single national brand that every producer can leverage we should be able to reduce the cost of exporting (by reducing the cost of differentiation) and tell a clearer and cleaner story to the world.


There is a lack of collective, nationally contextualised, tracing, assurance, branding, and marketing systems and schemes across the sector. This is not just an issue in the seafood sector but rather one across the entire primary production sphere.

While a few individual companies—discussed in the solutions section—have their own tracing and assurance, and many have their own branding and marketing, to have an impact in the international market and to achieve the scales of economy necessary to make these economically viable, they should be done at a collective level. This connects with the reality that much of the seafood caught is sold as a commodity on the global market.

As it stands there is no single overarching 'Aotearoa New Zealand seafood' brand or way to trace and verify the origins of fish caught across Aotearoa New Zealand waters. Norman (2016, p. 12) explains:

> Marketing New Zealand seafood is generally undertaken individually by each business that exports. Any attempt to bring a new species to market must be promoted by each individual business. There is no 'New Zealand seafood' brand or label. Many industry sources were opposed to a consolidated brand like the Zespri model. Each company is looking to build its own brand. Nevertheless, it seems to us that marketing dollars from a relatively small global player like New Zealand (0.9% of global seafood exports in 2014) would go much further if pooled together.

This ultimately reduces the ability to add value on the global stage. An example provided by Norman (2016, p. 12) is that:

> The view of New Zealand's largest finfish exports as just another 'whitefish' protein source does not maximise the value that may be extracted from the fact that this seafood is caught in arguably the most sustainably managed fisheries in the world.

Much of the seafood caught in Aotearoa New Zealand is sold undifferentiated into the global market with no way to trace or verify it. The "identification, origin and history of seafood products are made more difficult by globalisation of trade and the lack of international information standards" (Sterling et al., 2015, p. 211-212). However, as will be examined below, individual companies manage to do this so there is no reason a collaborative scheme could not work.

Cost barriers

All of the differentiation solutions cost time and money and require the capacity and skills, and as noted in the pāhekoheko section most iwi already struggle with these issues in terms of utilising their fisheries resources. Furthermore, they are able to make reasonable returns with little risk or invested capital. "The ease with which income can be earned through renting this quota to offshore fish capture companies," Memon and Kirk (2011, p. 113) explain, "without the need to invest in either boats or processing units, means that the impetus [for development] is currently low." That said, there are potential risks on the horizon and while they are making returns, they are not maximising the resource nor are they fulfilling wider socio-economic empowerment of their people.

Aquaculture constraints

Aquaculture has long been held out as a way for the seafood sector to expand beyond the hard limits of wild catch. The most significant trend in the seafood industry has

been the rapid rise in aquaculture, globally "aquaculture production increased from 40 million tons (MT) in the year, 2000 to almost 90 MT in 2012" (Sterling et al., 2015, p. 210). As of 2015, aquaculture accounted for roughly 50% of all seafood produced globally (Sterling et al., 2015). "Over the past 50 years, New Zealand's aquaculture industry has developed from a small but pioneering core of business-minded innovators into a professional, specialized and high-quality food production sector" (Heasman et al., 2020, p. 2). Hersoug (2018, p. 106) explains how in "2001 the New Zealand Aquaculture Council had great expectations for the industry, projected to grow to more than 1 billion NZ$ within 2020." However, two decades later "aquaculture still plays a rather modest role in the [New Zealand] seafood industry, being responsible for only 11% of value added in the seafood sector" (Hersoug, 2018, p. 106). "New Zealand has 15,000 km of coastline, making it one of the longest in the world," Stenton-Dozey et al. (2021, p. 2) explain, "However, there are currently only around, 20,000 hectares of water space allocated for marine farming."

Te Puni Kōkiri (2009, p. 1) outlines the more prosaic and practical constraints, noting that:

> [A]quaculture in New Zealand can be a high risk venture, typically has high capital and operating costs, generally requires large scale production to achieve a good return on investment, and often the return comes only after a prolonged period of investment.

Looking forward, the Land Based Aquaculture Assessment Framework (n.d.) also identifies a number of wider constraints, including:

- Disease
- Sustainability
- Feed supply
- Consumer acceptance
- New species development
- New technology development
- Global warming
- Traceability and food safety
- Social licence

Heasman et al. (2020) note that there are several broader systemic constraints to aquaculture: many inshore shellfish growing areas have reached their social carrying capacity; salmon aquaculture is challenged in these same waters by increasing temperatures and low flow sites; and, inshore farming space also faces increasing threats from land-based anthropogenic activities that affect the growing environment.

Another major factor in this slow growth is both the consenting process and the opposition to new farms that can stymie new farms. Hersoug (2018, p. 106) explains how "the system of allocating space in the nearshore area ended up in prolonged conflicts and finally a moratorium, which implied that the industry lost momentum." This is an issue raised by Norman (2016, p. 2) as well, who notes that while "[o]portunities to grow volumes will come through more aquaculture… local opposition to aquaculture often makes the approval of new water space for that purpose a challenge." As Stenton-

Dozey et al. (2021, p. 14) explain, "new farm developments often receive objections from recreational boat users, fishermen, adjacent landowners and conservationists." Similarly, referring specifically to mussel farms, Banta and Gibbs (2009, p. 172) note:

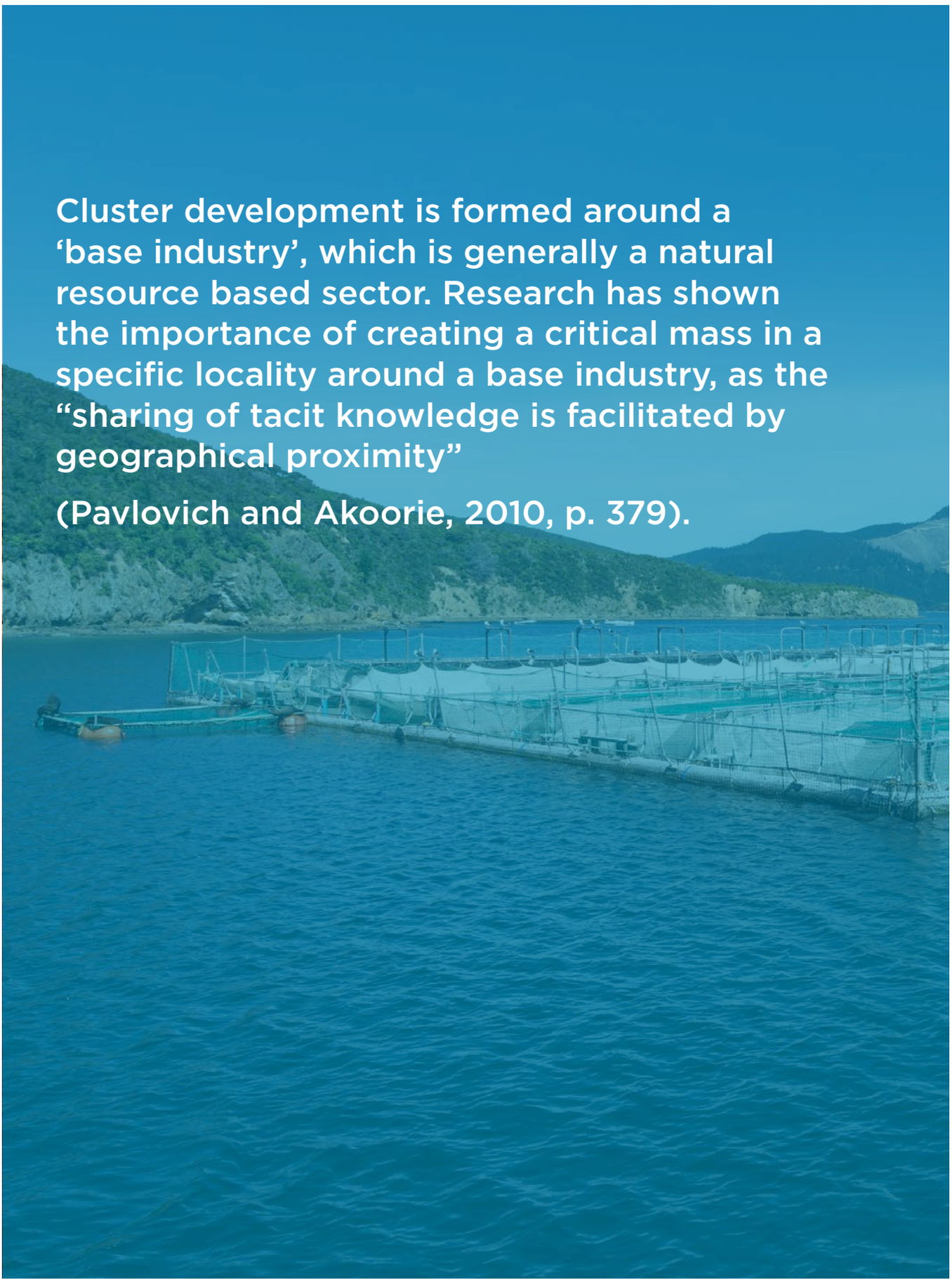
> Mussel farming in New Zealand occurs in the coastal ocean and hence requires the occupation of a common property resource. The other primary users of this space are Maori, the recreational boating and fishing sectors, the commercial fishing sector, and purely landbased sectors of the community who value the visual amenity of sites desirable to marine farmers... The legislation governing marine farming... demands that adequate consideration be given to all these other sectors.

Before 2011, farmers could apply to set up new farms only in aquaculture management areas (AMAs) established by councils. The AMAs were introduced as a management tool in 2004 but because of the complications of setting up an AMA, no new farms were approved under that regime. The 2011 legislative changes simplified the approval process by removing the need for AMAs, but this has not led to a significant increase in the number of farms. Another regulatory hurdle, particularly to the integrated multitrophic aquaculture possibilities outlined later, is that the:

> Use of seabed space for aquaculture is also a contentious issue. Current legislation provides for wild fishing industry ownership of all stock on the seabed. This precludes seabed culture or ranching of, for example, sea cucumbers, sea urchins or scallops (Stenton-Dozey et al., 2021, p. 14).

Mussel farming is "the cornerstone of the New Zealand aquaculture industry, marketed under the trademark of Greenshell™ mussels" (Stenton-Dozey et al., 2021, p. 2). However, as Stenton-Dozey (2007, p. 10) outlines:

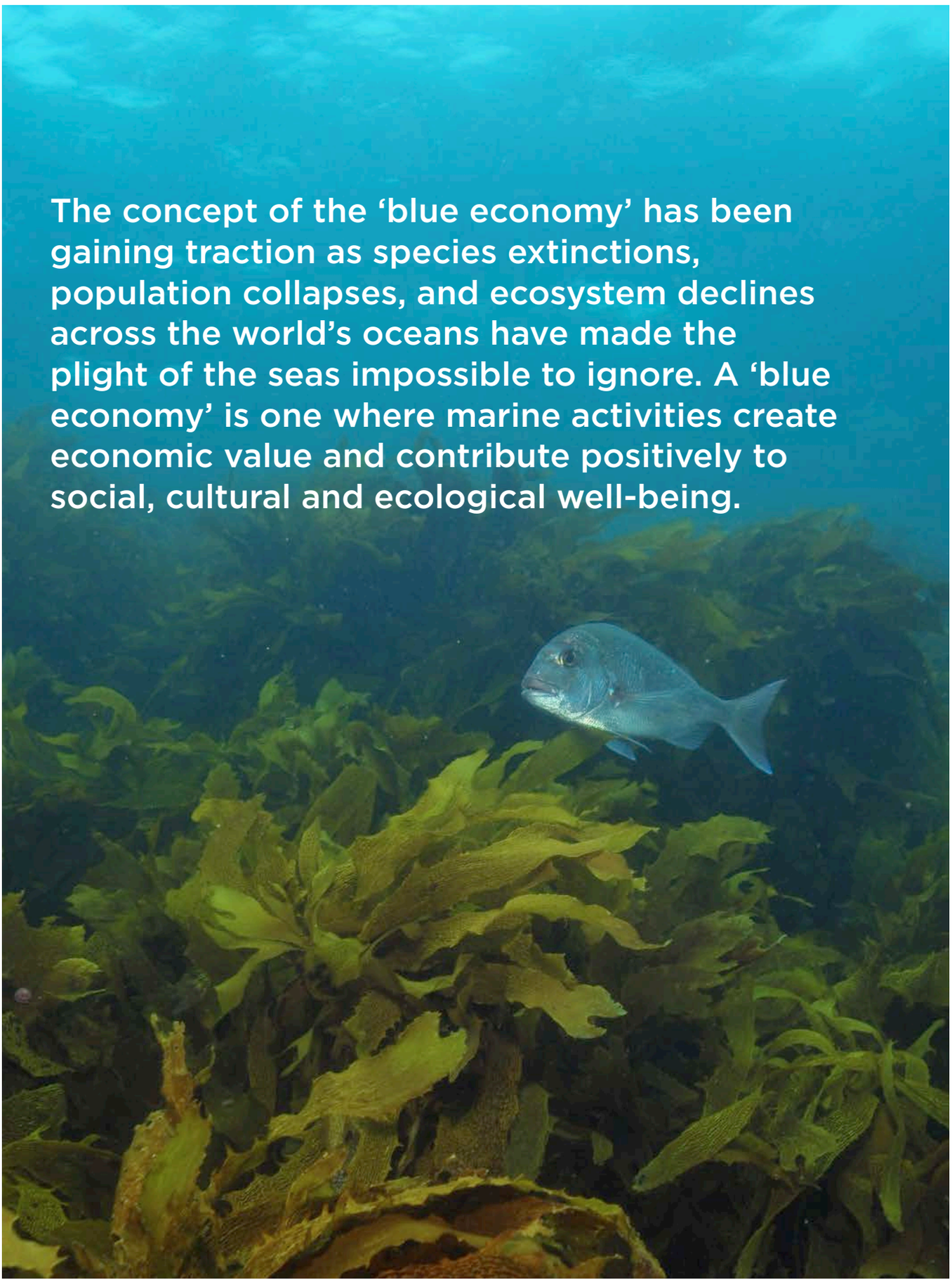
> Mussels are a low value product; the price has fluctuated little around an average of $5.10 per kg for annual export returns over the last 20 years. Stocking densities on existing farms are optimal, so increased profitability can only come from creating more farming space or culturing higher-value species – or by finding innovative ways to increase production per hectare without enlarging the environmental footprint.



Cluster development is formed around a 'base industry', which is generally a natural resource based sector. Research has shown the importance of creating a critical mass in a specific locality around a base industry, as the "sharing of tacit knowledge is facilitated by geographical proximity"

(Pavlovich and Akoorie, 2010, p. 379).

The concept of the ‘blue economy’ has been gaining traction as species extinctions, population collapses, and ecosystem declines across the world’s oceans have made the plight of the seas impossible to ignore. A ‘blue economy’ is one where marine activities create economic value and contribute positively to social, cultural and ecological well-being.



2.2 Potential solutions

Integration and collaboration

Integration as explored in the previous section could also help with differentiation. As Jeffs and Liyanage (2005, p. 10) explain:

> The incentive for Aotearoa New Zealand seafood enterprises to achieve efficiencies by integrating a wider range of species and expand raw material supply options has included the rapid development of aquaculture supplies in Aotearoa New Zealand. As a result, compared with other countries the Aotearoa New Zealand aquaculture industry has a very high level of ownership and involvement from seafood enterprises previously principally involved in wild capture fisheries.

Likewise, Memon and Kirk (2011, p. 112) note:

> Over half of Ngati Kahungunu's total income is created by its fisheries assets, utilising both inshore and offshore fish quota. In 2002, Kahungunu was reportedly looking at establishing a, 200-tonne processing plant that would provide 10 jobs to the community. They had also been approached earlier by Chinese interests about a bigger, joint-venture, 2000-tonne plant.

Cluster development

One possible solution for auahatanga is 'cluster development'. Cluster development is formed around a 'base industry', which is generally a natural resource based sector. Research has shown the importance of creating a critical mass in a specific locality around a base industry, as the "sharing of tacit knowledge is facilitated by geographical proximity" (Pavlovich and Akoorie, 2010, p. 379). As Pavlovich and Akoorie (2010, p. 379) explain, "regional production 'clusters' include the linkages between core, support and infrastructure within related industries." The base industries at the core of these clusters:

> [G]enerally create the economic conditions necessary for the emergence of subsequent industries to (i) serve the consumption needs of the labour employed in the base industry and their families and (ii) serve the industrial needs of the base industry both for inputs (backward linkages) and further processing of its outputs (forward linkages) (Sigfusson et al., 2013, p. 154).

Cluster development provides a multiplier effect. They are "important to local economies as they assist in the growth of regional development through improved firm performance, increased benchmarking and new business activity" (Pavlovich and Akoorie, 2010, p. 379). As Sigfusson et al. (2013, p. 154) explain the "downstream and upstream industries, in turn, generate demand for further industries and so on. give rise to other production activities and, therefore, generate a value-added far above its direct contribution to the GDP [gross domestic product]." The key components of a fishing cluster are harvesting, processing, and marketing, though harvesting sits at the core as the crucial primary generator of income, and there are many more ancillary components, including supporting sectors like "the packaging industry, fishing gear manufacture, shipping/haulage operations, diverse mechanical manufacture, the metal industry and public administration [such as fisheries management, maritime and port governance and operations]" (Sigfusson et al., 2013, p. 155). The benefits of cluster development include local employment, increased technology and learning

environments, stronger social development and, because of the localisation, more responsibility towards environmental, social and cultural conditions (Pavlovich & Akoorie, 2010).

Memon and Kirk (2011, p. 112) quote a Treaty claim negotiator and a highly respected iwi member, who explains that his vision for Māori fisheries is:

> [I]wi themselves owning and operating all the necessary components of a seafood exporting sector, embedding themselves locally and globally. The fish-processing plants and owner-operator fishing vessels could be funded by iwi organisations, creating an institutional knowledge of the seafood industry within the community. Export profits could be used to benefit the local community, employing younger members and giving them the opportunity for social mobility and personal affluence.

As they go on to explain, this mutually-beneficial 'ecosystem' is able to maintain "international competitiveness through generating rapid innovation in products, processes, and services with better integrated industry and education facilities" (Memon & Kirk, 2011, p. 112). Clusters are ideal for Aotearoa New Zealand, where companies are relatively small, as they provide a means of gaining scales of economy, particularly "in the seafood sector where smaller companies were found to spend considerably little of their turnover on research and development activities compared to larger enterprises" (Jeffs & Liyanage, 2005, p. 15). Bergesen and Tveterås (2019, p. 298) also note how "economies of scale are realized by localization in clusters… Localization in a cluster can yield economic benefits; agglomeration economies." Bergesen and Tveterås (2019, p. 298) explain that there are "three important sources of agglomeration economies in salmon farming: (1) thicker input markets, (2) localized knowledge spillovers and (3) complementarities due to better alignment of activities." However, they also mention that "[q]uota income itself may not be sufficient for many to allow for cluster development, and the debts required to create the infrastructure necessary for these expansions may be difficult to service" (Memon & Kirk, 2011, p. 113). Jeffs and Liyanage (2005, p. 14) also indirectly indicate how clustering can encourage innovation, explaining that there:

> [H]as been a very heavy reliance by the New Zealand seafood industry on inhouse innovation activity, when stronger innovation performance could be achieved through building strong networks and linkages with science providers, tertiary institutions, and other enterprises in the sector.

Nelson is the pre-eminent example of a cluster development in Aotearoa New Zealand. The Porter Project identified Nelson "as an area whose seafood industry displayed some conditions of cluster development" (Bess, 2001b, p. 197). This was largely driven by its central location to many of the prime fisheries locations. At the time, the three large Nelson-based seafood firms held 61.6% of the quota and the region had 35 fish and shellfish processing plants with combined annual sales of $188 million (Bess, 2001b). The Nelson Seafood Cluster Committee (NSCC) was formed in 1991 "to take advantage of the seafood industry boom in Nelson throughout

the late 1980s" (Memon & Kirk, 2011, p. 112). The NSCC was formed to develop closer links between the seafood industry and related and supporting industries, including research and education institutions. The committee envisioned Nelson becoming a 'centre of excellence' across industry education, research, technology, and consultancy, with the aim of achieving the critical mass needed to sustain innovation and growth in a range of products and services across the sector (Bess, 2001b). At the core of the cluster are aquaculture, inshore and deep sea fishing, and processing operations, with a range of supporting and associated sectors that have grown around them, including boatbuilding, marine engineering, training (Nelson–Marlborough Institute of Technology's School of Fisheries), research (including a seabed mapping firm, two Crown Research Institutes, and a private research institute), and administration (such as specialist marine lawyers) (Bess, 2001b; Pavlovich & Akoorie, 2010). In terms of developing a range of supporting nodes for the base industry the cluster appears to have been relatively successful. One of the key strengths of the Nelson cluster "is the diversity of activities and complementation, which assists in reducing the competitive conditions at the inter-sector level" (Pavlovich & Akoorie, 2010, p. 382). As Pavlovich and Akoorie (2010, p. 382) explain, "[s]ubstantial interaction occurs across all four cluster layers, with core production activity of core firms and support firms being the most intense." It has also appeared to have fostered innovation, as discussed in a section below. However, there have been some areas where it has not performed as well (Bess, 2001b; Perry, 2005):

- The Committee was not as active in development as expected
- The big seafood firms have largely concentrated on creating their own international connections rather than local collaborations
- The School of Fisheries has struggled to become the leading seafood educational facility in the country
- Many of the national industry associations have stayed in Wellington rather than relocating as hoped
- No development of a 'shopfront' for the industry in Nelson, such as a fish market or seafood cuisine
- No integration with tourism
- Little dialogue between large fishers/processers and wider stakeholders

An executive of one of the larger fishing companies based in Nelson, but with ports elsewhere across the country, believes that the cluster project made little difference to the way they operate, as there was no way the public sector could provide the necessary support as a cluster's success is premised on good commercial relationships (Perry, 2005). This fits in with wider critiques regarding the need for a formal mechanism to encourage cluster development (Pavlovich & Akoorie, 2010).

Innovation

Innovation covers a broad scope of potentiality, from operational improvements on the water through to new ways of

marketing product to consumers. Innovation can be understood across several key categories: technological (eg new nets that target specific species), structural (eg new organisational forms that increase returns), product (eg new species commercialised, or new types of products developed), and procedural (eg new process like collective branding campaigns). There has been "a tendency for the seafood industry to focus more on production and process innovation versus market and product innovations that are targeted further down the value chain" (Jeffs & Liyanage, 2005, p. 15). This is problematic as these "later value innovations tend to provide higher value returns" (Jeffs & Liyanage, 2005, p. 15). In their examination of Norway, Bergesen and Tveterås (2019, pp. 304-305) somewhat corroborate Jeffs and Liyanage, finding that: [I]nnovations are clustered at the beginning and toward the end of the supply chain. At the start of the supply chain aquaculture suppliers are highly innovative and conduct all types of innovation. Innovation in aquaculture farms is focused on process innovation to incorporate innovation from the suppliers. Toward the end of the supply chain food processors conduct both product and radical innovation, while distributors and exporters conduct some product innovation.

There is some overlap with other solutions proposed across this report, including collaborative structures outlined in the pāhekoheko section and the developmental clusters outlined in this section. Also, due to the financial and capacity constraints many iwi and Māori fishers face, innovation is probably best conduced in collaborative structures. Before examining the potential avenues of innovation, some barriers need to be examined. Pavlovich and Akoorie (2010) identify a number of possible barriers, including the small size of Aotearoa New Zealand fishing companies and the sector as a whole, which make returns difficult to justify the costs of development, as well as limiting relevant training and skills across the sector. Torkington (2016, p. 182) points to the "concentration of rents and its appropriation by a small number of interests" as precluding "any of the efficiencies that market completion is argued to deliver, including innovation and upgrading along the value chain." As he (Torkington, 2016, p. 182) continues, this situation "diminishes incentives to create new value other than lobbying to increase the economic rent in any ameliorative regulatory intervention, and prevents small firms with aspirations and ideas from entering and raises barriers to innovation."

Conversely, Jeffs and Liyanage (2005, p. 7) argue that the introduction of the QMS led to increased innovation in the sector, referencing the "rapid increase in innovative activity following the introduction of harvest limits is in contrast to seafood industries in many other parts of the world." As they (Jeffs & Liyanage, 2005, p. 7) continue:

> [The QMS gives] greater certainty in the supply of raw product for seafood enterprises in New Zealand that is provided through holding a property right that guarantees access to a fish stock, and some assurance that the right can be fully exercised because of sustainable management of fish stocks.

A number of surveys of Aotearoa New Zealand enterprises have reported levels of innovation in the seafood sector that are higher than many other sectors in the economy, with "only 14% of seafood firms… found to have no innovation spending, compared to 26% across all economic sectors surveyed" (Jeffs & Liyanage, 2005, p. 8). Levels of value-adding is also "significantly higher for seafood products (72%), compared to other important primary producers in the New Zealand economy, e.g. meat (51%), dairy (35%), fruit and vegetables (35%)" (Jeffs & Liyanage, 2005, p. 8). Unsurprisingly, Bergesen and Tveterås (2019, p. 315) found that in Norway "internal R&D [Research & Development] employees in firms have a highly significant positive effect on the probability of all types of innovation." In Aotearoa New Zealand innovation has been driven by the "industry-led initiative, Seafood Innovations Ltd (SIL)" which was:

> [E]stablished in 2004 as a joint venture research partnership between Seafood New Zealand and Plant & Food Research, with funding from the Ministry of Business, Innovation and Employment (MBIE) to promote research projects that grow the value of New Zealand's seafood exports (Hannan, 2016, p. 14).

SIL's mandate is to fund projects aimed at:

- increasing the value of existing harvests or
- reducing harvesting and processing costs or
- enhancing consumer-driven product attributes

Jeffs and Liyanage (2005, p. 12) list a number of key characteristics that have helped to build innovative capacity in the seafood industry:

- A vibrant and entrepreneurial culture
- Very good market feedback and connectivity
- Strong communication and networking between key participants
- Co-operation and knowledge sharing in early development
- Effective industry co-ordination, leadership and representation
- An enhanced ability to absorb knowledge
- Rapid identifiers and adopters of new technology
- Sufficient resources to support the effort involved
- Close involvement of specialist suppliers to the industry
- Strong capabilities and commitment in the industry for research and development

As Jeffs and Liyanage (2005, p. 13) explain:

> [T]he rapid development of the Greenshell™ mussel industry during the 1980's relied on the open sharing of results of research and development on farming methods among entrepreneurial pioneers. However, in recent years technology for Greenshell™ mussel hatchery culture has been developed in parallel by separate seafood enterprises working with different research providers with little or no sharing of information.

Bergesen and Tveterås (2019, p. 304) make the distinction between three forms of knowledge needed in innovation: (1)

analytical (science based), (2) synthetic (engineering based) and (3) symbolic (arts based) knowledge bases. Analytical knowledge is strongly codified knowledge content, highly abstract and of a more universal nature, for example in scientific journal articles. We find analytical knowledge embodied in technologies and processes at all stages of seafood value chains. Synthetic knowledge is partially codified, but has a strong tacit component. This includes for examples the functioning of different production equipment technologies in farming, fisheries and seafood processing, and the interaction of these with fish biology and humans. Synthetic knowledge is based more on practical experience or learning-by-doing in firms' production activities. Symbolic knowledge (or artistic-based knowledge) is most relevant downstream in seafood value chains, in design, messaging and branding of seafood products in seafood processing and marketing stages.

Research in Norway has shown that:

> Aquaculture farms, seafood suppliers and fisheries tend to have the highest collaboration rate with universities and research institutes, but they also collaborate with a range of other organizations… Seafood processors tend to collaborate most with their suppliers, while distribution and exports companies collaborate most with their customers. (Bergesen & Tveterås, 2019, p. 304-305).

The vertically integrated nature of Aotearoa New Zealand's sector means that the collaboration on innovation probably occurs across this spectrum.

Technological innovation

Technological innovation is a common dynamic across all industries, one that has been speeding up in recent years, particularly since the massive changes wrought by the information and communications sector have played out across different industries. That said, more 'traditional' forms of technological innovation, excusing the oxymoron, also play a role in the seafood sector. "Blue technology economies generate value from the development and/or application of new technology", as Lewis et al. (2020, p. 82) explain, with potential coming from engineering, imaging technologies, and artificial intelligence for offshore aquaculture; ocean-based energy production utilising kinetic energy or wind, as well as information and communication technology, amongst many possible areas. Technologies that reduce environmental impacts could lead to gains at collective scales through "reduced environmental harms and value gains from environmental certification, provenance values, and branding" (Lewis et al., 2020, p. 35). In other words, technological developments can also have cascading innovation impacts across other areas of innovation, such as procedural. However, Lewis et al. (2020) also note that productivity gains that lead to cost reduction in isolation from similar advances elsewhere in the economy could put pressure on jobs, indicating that innovation does also pose a risk for the aim of whakatautika.
Another significant:

> [C]hallenge 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 (Lewis et al., 2020, p. 106).

Lewis et al. (2020, p. 82) also discuss how "Blue biotechnology is emerging as both an enabler of marine activities and a configuration of activities." There is a diversity of potential actors in marine technological innovation, from venture capitalists to universities, and technology entrepreneurs. "Econometric analyses of firm-level data" Jeffs and Liyanage (2005, p. 8) explain, "shows that some firms in the seafood sector are achieving very high levels of relative economic efficiency, particularly through effective use of capital and labour saving technological change."

There are a wide range of possible 'traditional' innovations, these are enabling technologies for existing activities such as "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" (Lewis et al., 2020, p. 40). One of the most significant traditional forms of innovation in the sector has been developed in Aotearoa New Zealand through a Primary Growth Partnership programme collaboration between the Ministry for Primary Industries, Sealord Group, Moana NZ and Sanford Ltd. The programme developed Precision Seafood Harvesting (PSH) – with the new technology now called Tiaki. The PSH system replaces traditional nets, instead containing fish inside a flexible polyvinyl chloride (PVC) tubular receptacle with holes that allow undersized fish to swim out and enabling the fish to be brought on-board largely undamaged. The method also allows for better targeting of specific species and better tracking of when and where the fish are caught, which has further innovative potential for provenancing, as discussed later. As Norman (2016, p. 2) notes, "New technologies such as PSH will improve the efficiency of catch while also reducing damage to fish and doing much to bolster New Zealand's environmentally-conscious image. These benefits could provide a useful basis for higher prices."

Okains Bay Longline, a Māori owned fishing company, have introduced a range of traditional and more radical innovations. The company "developed recyclable cardboard packing featuring water-based inks, instead of the traditional polystyrene boxes used by the fishing industry… [and their] fishing vessel [is] run on a biodiesel mix made in New Zealand from recycled cooking oil and sustainably-grown canola." (Revington, 2013, p. 37). In a more radical move, the company has also developed a quick response (QR) code and underpinning system that provides tracing and provenance. As the owner Greg Summerton (New Zealand Story 2015, para. 14–15) explains:

> Our QR code system was an industry first. Major buyers have been blown away by the system. It means each customer can use their smart phone to find the status of the fisheries, how it has been harvested, where we caught it, when we caught it, when it was processed and how it was shipped.

> More than just proving the provenance of our product, the QR code system leads into the whole Okains Bay story, the environment these fish come from, the Whakapapa and the sustainability of the fisheries. It allows our customers to connect with us on a deeper level.

Structural innovation

As Pavlovich and Akoorie (2010, p. 384) note, clusters help foster innovation, in other words a structural innovation can generate further innovations – as they explain "through co-location, innovation spreads to related industries." "The central feature of these knowledge creation systems is the manner in which the linkages between firms, sectors and infrastructural institutions are harnessed to create a sustainable regionally connected and developed network system" they (Pavlovich & Akoorie, 2010, p. 382) argue. Innovation can emerge out of multi-sector partnerships within a regional context (Pavlovich & Akoorie, 2010). One of the strengths of this seafood regional context is the diversity of activities and complementation which assists in reducing the competitive conditions at the inter-sector level. Substantial interaction occurs across all four cluster layers, with core production activity of core firms and support firms being the most intense. "Organisational innovation", Jeffs and Liyanage (2005, p. 7) note, "has also resulted in the emergence of highly vertically integrated and diversified seafood enterprises that are utilising a variety of raw materials and supplying a wide range of markets."

Product innovation

The development of new products comes largely through either commercialising new species or using existing species in novels ways, either as different food products or in entirely new ways. "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" (Lewis, 2020, p. 34).

In terms of using seafood species in novel ways, there are a range of current and potential developments. Pavlovich and Akoorie (2010, p. 382) provide an example of how salmon is being developed into new food products. As well as the traditional gilled, gutted, and filleted "there has been significant technological innovation into more value-added processing of the products, such as sliced, hot and cold smoked products, or marketing of innovative products such as salmon roe" (Pavlovich & Akoorie, 2010, p. 382). Producers have also been experimenting with marinated mussels flavours and serving styles (Pavlovich & Akoorie, 2010).

As well as creating novel food products, there is also potential to develop new non-food products. Many of these new products may be "derived from sophisticated processing technologies", showing how technological innovation can further increase other areas of innovation (Lewis et al., 2020, p. 40). Reinforcing the role technological innovation

can play, Lewis et al. (2020, p. 40) highlight the potential of "bioactives that yield patents and potential commercialisation opportunities for as yet unimagined, unknown or un-marketed products via a derivative biotech industry." One area of growth is in health and nutritional products, with many Aotearoa New Zealand and international seafood firms moving into this growth space. Lewis et al. (2020, p. 41) refer to the "ease of taking a fully processed and non-perishable product to high-volume global markets i.e. relative to a perishable food product." For example, mussel powders not only provide a higher return than over selling mussels as unprocessed foods, but they are also more durable and stable making them easier to export (Lewis et al., 2020). Mussel oil is also growth component of the wider mussel exporting industry, worth around $300m to Aotearoa New Zealand. As these alternative uses of mussels increase in popularity, they have also driven up the price of live green-lipped mussels (Lewis et al., 2020). Product innovation has also been focused on reusing the waste produced by the industry. As only 30% of the fish catch is used directly for consumption there has been substantial research and development into how waste can be used to add value and reduce the environmental impact (Pavlovich & Akoorie, 2010; Sharp et al., 2022).

In their examination of product innovation in the seafood sector MBIE (2017, p. 53) detail a number of trends:

- Large brands are innovating in the drive to increase value added product lines
- Innovative products target a gap in the market (e.g. premium seafood, need for convenient snacking, gluten-free options)
- Innovative products target demand for sustainable, premium, authentic products
- Innovation is supported in New Zealand by government supported programs (e.g. MPI's Primary Growth Partnership) and by research centres (e.g. Cawthron Institute)
- Innovation often enabled by availability of new technology or science
- Emergence of new packaging forms, materials and technologies (e.g. aseptic pouch) is ongoing globally

MBIE also provide a number of examples of product innovation as shown in Figure 5, on the following page (Note: MBIE. 2017, p. 53).

Procedural innovation

In terms of procedural innovation, Okains Bay Longline has created a value chain into the United States and United Kingdom They process their own fish and control the entire supply chain selling directly to retailers:

> Fifteen percent of the catch goes into retail, mainly through a deal Greg made with one of the largest supermarket chains in the US. It is also the world's seventh–largest supermarket chain and through that relationship, Greg and his company now has a foothold in the UK market. The product is frozen fish. 'I had a dream a long time ago of retail boxes of frozen fish in supermarkets around the world,' says Greg as he whips out the boxes in which

Figure 5. *Product innovation*

INSIGHTS

- **Smoked on-trend - "Holy Smoke', "The Smokehouse", "Sealord" with ready to eat smoked salmon, smoke white fish and smoked shellfish range**
- **Products in line with convenience trends, and health and wellness**
- **Cawthorn Institute, New Zealand's preeminent seafood research centre assisting Smokehouse with packaging and shelf-life technology**

INSIGHTS

- **Sealord's range of Gluten-free crumbed hoki fillets and crumber hoki bites**
- **In-line with growth of gluten-free options**
- **In-line with sustainable, ethical harvesting**

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INSIGHTS

- **Sanford's "Big FGlory Bay" brand is a high value, high margin premium brand covering slamon, mussels and oyster categories**
- **Brand aims to acheive a 40% premium over commodity seafood products**
- **Brand messaging around provenance and story telling - from the pristine waters of New Zealand**

Best Aquaculture Practices Certification
The Responsible Choice

Note: MBIE. (2017, p. 53).

his fish are marketed . The packaging is eye-catching and was developed by Greg — which is where his flair for art came in handy. To research the market, he flew to Los Angeles. 'The idea was to get on a plane, get to Los Angeles and walk down the aisles of every supermarket, buying all the fish products that looked like potential competitors. I took them back to my hotel room and made a hell of a mess pulling them apart to see how they were put together.' The normal route to getting a product in a supermarket would be to go to a city like Los Angeles and pester the manager of a regional supermarket for a meeting. If you're lucky, you then get passed on up the chain to a depot manager who is in charge of a bunch of regional supermarkets, and then maybe a buyer at head office. Greg bypassed that route and somehow wangled a meeting with the chief buyer in Seattle. 'We got the name of the man at the top and sent him all our info. He looked at it and we started a conversation through email and then said we would be in Seattle on such and such a date, and arranged a meeting' (Revington, 2013, p. 37).

Aquaculture

Aquaculture has huge potential for the Aotearoa New Zealand marine economy, providing a way of bypassing the wild catch limits. As MBIE (2017, p. 6) explains:

> New Zealand has huge theoretical potential in aquaculture production. New Zealand has the 10th longest coastline of any country in the world, more than China and 180 other countries on the world. Currently only a tiny fraction of this is farmed; the total area in New Zealand in aquaculture is similar to the area in onions or a single high country sheep farm (MBIE, 2017, p. 6).

Māori already have a significant stake in aquaculture, as TOKM (2018, p. 3) outlines:

> The current value of aquaculture settlements to Iwi Aquaculture Organisations exceeds $200m. These settlements include 500+ hectares of mussel space in Tasman and the Hauraki Gulf and 60 hectares of fish farming space also in the Hauraki Gulf to iwi. Because the development of aquaculture will take place over several years, the value of it will not be realised for some time. As more new space becomes available for aquaculture, iwi are entitled to, 20% of agreed space and Te Ohu Kaimoana works to ensure this is realised.

In 2019, MPI released its Aquaculture Strategy, which identifies three key drivers that can help the sector reach the $3 billion target by 2035: maximising the value of existing farms through innovation; extending into high value land-based aquaculture; and, extending aquaculture into the open ocean (MPI, 2019, pp. 4–5). The strategy has four outcomes: sustainable – a primary industry that leads in environmentally sustainable practices across the value chain; productive – aquaculture growth that supports regional prosperity; resilient – aquaculture is protected from biological harm and supported in adapting to climate change; and, inclusive – partnering with Māori and communities on opportunities to realise meaningful jobs, wellbeing, and prosperity (MPI, 2019, pp. 8–9). There is much in this strategy for Māori, and in terms of differentiation existing Māori aquaculture projects can look at the government's focus on maximising innovation, growing productivity, and the desire to increase sustainability along the value chain as the three key elements.

Regarding innovation, the strategy explains that it is "key to New Zealand delivering premium, high value products to the world", identifying mussel oils, powders and extracts, high value nutrition, and premium salmon as key focal points (MPI, 2019, p. 4). The strategy also notes that, with respect to productivity, there "is huge scope to add value within the existing farm footprint through selective breeding, premium products, high value nutrition, and diversification into algae – a future super food" (MPI, 2019, p. 12). It also identifies the need to "[f]acilitate co-investment between industry, iwi and government in priority research and innovation" (MPI, 2019, p. 12). On sustainability, the strategy notes the need to "maintain New Zealand's reputation and the value of our brand, we need to demonstrate to New Zealanders and international consumers that our aquaculture industry is world-leading in sustainable management" (MPI, 2019, p. 10).

In terms of overcoming the opposition to new farms, several studies propose efforts to increase the social license. Quigley and Baines (2014, cited in Stenton-Dozey et al., 2021, p. 14) note that "gaining access to more space will require the industry to gain a stronger social license to operate by demonstrating that it is sustainable in the long term and that visual impact issues have been addressed". Likewise, Baines and Edwards (2018, pp. 140-141) explain "aquaculture has been at the forefront of primary sectors exploring SLO [social license to operate], likely due to recent critical public opinion in response to proposed plans for

expansion." Another option for overcoming the opposition is to focus on open ocean farming, as this moves production "away from many competing uses and values" (MPI, 2019, p. 13).

Currently, the Aotearoa New Zealand aquaculture industry is based primarily on the production of Greenshell™ mussels, Chinook salmon and Pacific oysters" (Stenton-Dozey et al., 2021, p. 1). One way for aquaculture to increase revenue is through the addition of new species. Two commonly referenced possibilities are yellowtail kingfish and hāpuku. These two candidates emerged through research by NIWA's National Centre for Aquaculture, as the two mostly likely to "maximise the economic yield of New Zealand aquaculture within the limits of acceptable environmental change" (Symonds et al., 2014, p. 371). Other potential subjects for aquaculture identified by Crimp (2007) include eels, whitebait, rock lobsters, snapper, kina, Bluff oysters, geoduck clams (pronounced gooey-duck) and turbot, as well as some seaweeds and sponges. Pavlovich and Akoorie (2010, p. 380) identify "[p]otential growth in the aquaculture industry involves species such as eels, whitebait, snapper and seahorses." The need for farming new species is something identified by MPI's Aquaculture Strategy (2019b, p. 12), which outlines the need to "[s]upport the implementation of the National Environmental Standards for Marine Aquaculture to create confidence to invest and enable changes to trial new species and technologies."

One way of harnessing the current aquaculture sector for increased growth is through Integrated Multitrophic Aquaculture (IMTA), sometimes referred to as 'polyculture', where 'integrated' refers to intensive and synergistic cultivation, using water-borne nutrient and energy transfer and 'multi-trophic' means that the various species occupy different trophic levels, ie, different (but adjacent) links in the food chain. National Institute of Water and Atmospheric Research (NIWA) is exploring IMTA, which they describe as "the scientifically based culture of complementary feeding groups in close proximity for the benefit of the cultured species, the environment, the economy, and society. Integrated co-culture is based on an ancient concept that has been the pivot of aquaculture in China for centuries: the waste from one cultured species is recycled to feed another species." (Stenton-Dozey, 2007, p. 10). NIWA are "combining mussels with high-value Chinook salmon ($9.20 per kg), sea cucumbers ($15–25 per kg), and two species of seaweed ($ variable per kg)" (Stenton-Dozey, 2007, p. 11). IMTA "is gaining momentum and the interest from researchers and industry as it is seen as an innovative tool to address many of the challenges currently being faced by this sector" (Stenton-Dozey et al., 2021, p. 1). IMTA essentially sees other complementary species added to existing aquaculture farms, with current research examining both kelp and sea cucumbers.

The other key is to add value to existing species with potential. As MBIE (2017, p. 6) explains:

> Where New Zealand farms King/Chinook Salmon (Oncorhynchus tshawytscha),

> effectively all other salmon aquaculture in the world farm Atlantic salmon (Salmo salar), due to its faster growth rates and disease resistance. Salmon aquaculture is highly consolidated globally. The top 3 firms account for ~40% of global production (the top 10, ~65%). None of the top 25 global salmon producers currently operate in Aotearoa New Zealand. Consolidation is driven by clear economies of scale in production systems, marketing, processing, skills, genetics and capital. Aotearoa New Zealand biosecurity effectively prevents imports of almost all fresh salmon.

Stenton-Dozey et al. (2021, p. 5) also note that:

> Chinook salmon is generally regarded as a premium salmon species in terms of taste and nutritional quality, possessing a higher fat and Omega-3 oil content, larger fillet size and better texture characteristics than Atlantic Salmon. Consequently, New Zealand salmon farmers have managed to develop a niche market and premium price for their product and compete successfully with Atlantic Salmon.

The "salmon industry has grown into one of the largest producers of farmed Chinook salmon in the world" (Stenton-Dozey et al., 2021, p. 2).

Take New Zealand King Salmon (NZKS) as an example. The "focus on king salmon enables NZKS to maintain a point of difference in the market: 'King salmon is a highly regarded, well-reputed species to go to the market with . . . It is something they want to buy and is in scarce supply; so we get a premium for our product.'" (Sankaran & Suchitra Mouly, 2006, p. 391). The "continued focus on king salmon has accrued into 'intellectual property [at NZKS] about vertically integrating the hatching, production, harvesting, processing, sales, distribution, and marketing of king salmon in a profitable manner.'" (Sankaran & Suchitra Mouly, 2006, p. 391). The company "competes against Atlantic salmon such as Australia, Japan, and North America. As NZKS accounts for 40% of world production of farmed king salmon, it is able to set its own price depending on how much it wants to sell" (Sankaran & Suchitra Mouly, 2006, p. 391)

As Sankaran and Suchitra Mouly (2006, p. 392) outline:

> Value-added product at NZKS is something which has had more value-added than a whole fish; NZKS realizes somewhere between 30% and 50% of its sales by value beyond a whole salmon. As one would expect, there are varying degrees of value addition at NZKS depending on the number of stages that the product flows through in the processing facility. The highest forms of value-addition are represented by products such as smoked salmon and salmon dips.

At "NZKS, the raw material itself is a source of differentiation as opposed to just the end-product" (Sankaran & Suchitra Mouly, 2006, p. 392).

Sankaran and Suchitra Mouly (2006, p. 392) further explain that:

> An element of NZKS's strategy that is related to its differentiation from commodity markets is the reduction of its exposure to commodity cycles. Related to this reduction is NZKS's attempt to make its supply chain more demand-driven, i.e. growing more fish in 'response to a potential perceived demand as opposed to growing more fish so that we

> can go out and sell it somewhere.' As a result, harvest volumes have been relatively static for some years now.

That said, the focus must be on what the markets want. The Land Based Aquaculture Assessment Framework (n.d., para. 21) notes that:

> The growing middle class in developing regions and the sheer number of 'wealthy' in these regions will make these markets more attractive for aquaculture producers to sell into. The efficiencies of intraregional trade, which will not necessitate transcontinental shipments, have simpler logistics, will further fuel growth in intraregional trade. The rapidly growing middle class with rising disposable incomes will favour NZ aquaculture exports of specific products. The growing middle class in our neigbouring [sic] Asian region must not be ignored as this demographic will shape the future of aquaculture in the region and NZ must be a part of this trade.

While species like Chinook salmon are desirable, it also pays to target these Asian countries with growing middle classes, farming species they will pay premiums for.

Aquaculture could of course fit in with wider cluster development, and community, development projects. The integration between the existing fishing companies and newer aquaculture developments "has undoubtedly assisted with the rapid growth of aquaculture in New Zealand through assisting in production, processing and market innovations build on the knowledge and experience from taking wild capture product to market." (Jeffs & Liyanage, 2005, p. 10).

Another idea that could help encourage more aquaculture projects is the creation of tradable property rights, which were outlined in the pāhekoheko section, to provide greater stability for investors. As Jeffs and Liyanage (2005, p. 14) explain:

[T]here are strong indications that the introduction of tradeable in-perpetuity property rights for marine aquaculture space in New Zealand would continue to generate economic benefits through similar mechanisms attributed to the QMS for wild stocks. Aquaculture enterprises have had difficulty raising capital and undertaking innovation activities under the outdated marine farming laws.

This position is backed up by Joyce and Satterfield (2010, p. 106), who note that:

> Aquaculture tenures or leases have become an increasingly important management tool for regulating access rights to coastal and offshore marine habitat. Tenure, as a form of private property rights to marine space, is generally considered a prerequisite for aquaculture development, as are the associated exclusive access rights which provide necessary incentives for producers to invest in infrastructure.

Aquaculture is an area that demands innovation in a way that wild catch does not. Sankaran and Suchitra Mouly (2006) detail the structure and success of New Zealand King Salmon, providing five reasons it is a good case study for examining innovation. As they (Sankaran & Suchitra Mouly, 2006, pp. 388–389) explain:

> Firstly, the percentage of sales that is invested by NZKS in R&D is more than that for most firms in the New Zealand aquaculture sector. Second, NZKS's investment, as a percentage

> of sales, in the development of new products and new processes (in both manufacturing and distribution) as well as the development of new markets is comparable with that invested by larger aquaculture companies overseas… Third, NZKS is highly export-oriented, realizing over half its sales revenue as well as volumes from exports… Fourth… NZKS belonged to the top 1–2% of salmon-farming companies around the world in terms of profitability… Finally, by being vertically integrated, NZKS offers a vista of innovation in the entire value chain.

Value chains

The concept of the value chain has becoming an increasing focus of Aotearoa New Zealand's primary sector, seen as a way of maximising export returns by moving from a raw commodity focus to one that is geared towards selling premium finished goods in a targeted fashion at key consumer groups (Saunders et al., 2016). Lewis et al. (2020, p. 81) "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" as Lewis et al. (2020, pp. 81–82) continue, "has tended to fall into three broad strategies: the promotion of technology, design, or provenance values." However, 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" (Lewis et al., 2020, pp. 81-82). Many marine economy activities in New Zealand "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" (Lewis et al., 2020, p. 82).

While vertical integration across the industry has been a negative for whakatautika, Bess (2006) indicates that it is an important aspect of creating a value chain. Management of the country's biggest vertically integrated firms "expressed the view that vertical integration is critical to their firms' competitiveness. None of the seafood firms have opted to reverse their vertical integration or entirely outsource any particular value chain activity" (Bess, 2006, p. 375). As he (Bess, 2006, p. 375) explains:

> Secure access to the fisheries resource has provided New Zealand seafood firms with opportunities for vertical integration. Vertical integration is a complex and costly means of creating a competitive advantage, which is generally desirable when firms can use market imperfections to create an advantage through cost savings due to internal control and coordination and reducing uncertainty in the supply of critical inputs.

Market insights

Understanding the globally diverse markets is critical in establishing a value chain as these can offer 'paths of least resistance' in terms of exporting, though producers need not be limited to utilising existing market dynamics. While Aotearoa New Zealand exports its produce around the world, there are some general commonalities in terms of export locations and types of products as well as some seafood sector specifics. This section will deal in total scope, key destinations, products, and distributions.

Total scope of markets

The total scope of the market is significant. According to MBIE (2017, p. 12) in 2017:

> Total global cross-border demand for seafood was US$122b in 2015; the key markets are Europe ($48.2b), the US ($17.8b), Japan ($11.7b) and China/HK (~$10b) - Vietnam, Thailand, South Korea, China and a wide range of other smaller markets stand out for import market growth; Japan and Russia shrank over the period – Markets vary in average seafood import price, with Hong Kong, the USA, Canada and Japan, followed by the "Big 4" Europeans, standing out as high value markets.

Aotearoa New Zealand's role in this global market is relatively small, achieving "a 7% share of the temperate Southern Hemisphere (S.H.) wild catch" (MBIE, 2017, p. 5). "Global seafood production (capture and aquaculture) is concentrated in E/SE [East/Southeast] Asia", MBIE (2017, p. 12) explains, "New Zealand is a smaller, second tier producer overall." According to Williams et al. (2017, p. ii), Aotearoa New Zealand annual average between 2010 and 2015 had:

> [A] direct output value of $1,727 million and a total output value of $4,179 million; a direct contribution to gross domestic product (GDP) of $544 million and a total GDP contribution of $1,609 million, being 0.7% of New Zealand GDP [and] exports of $1,500 million, being New Zealand's fifth largest export commodity by value and representing 3.2 percent of total exports.

Breaking this down across the different subsectors, Williams et al. (2017, p. ii) detail how over the same period:

> Deepwater fishing produced a total output value of $1,762 million, total contribution to GDP of $679 million and total employment of 5,679 FTEs [Full Time Equivalent jobs]; HMS [Highly Migratory Species] produced a total output value of $197 million, total contribution to GDP of $76 million and total employment of 637 FTEs; Inshore fishing produced a total output value of $1,197 million, total contribution to GDP of $460 million and total employment of 3,861 FTEs; Shellfish produced a total output value of $1,022 million, total contribution to GDP of $394 million and total employment of 3,291 FTEs.

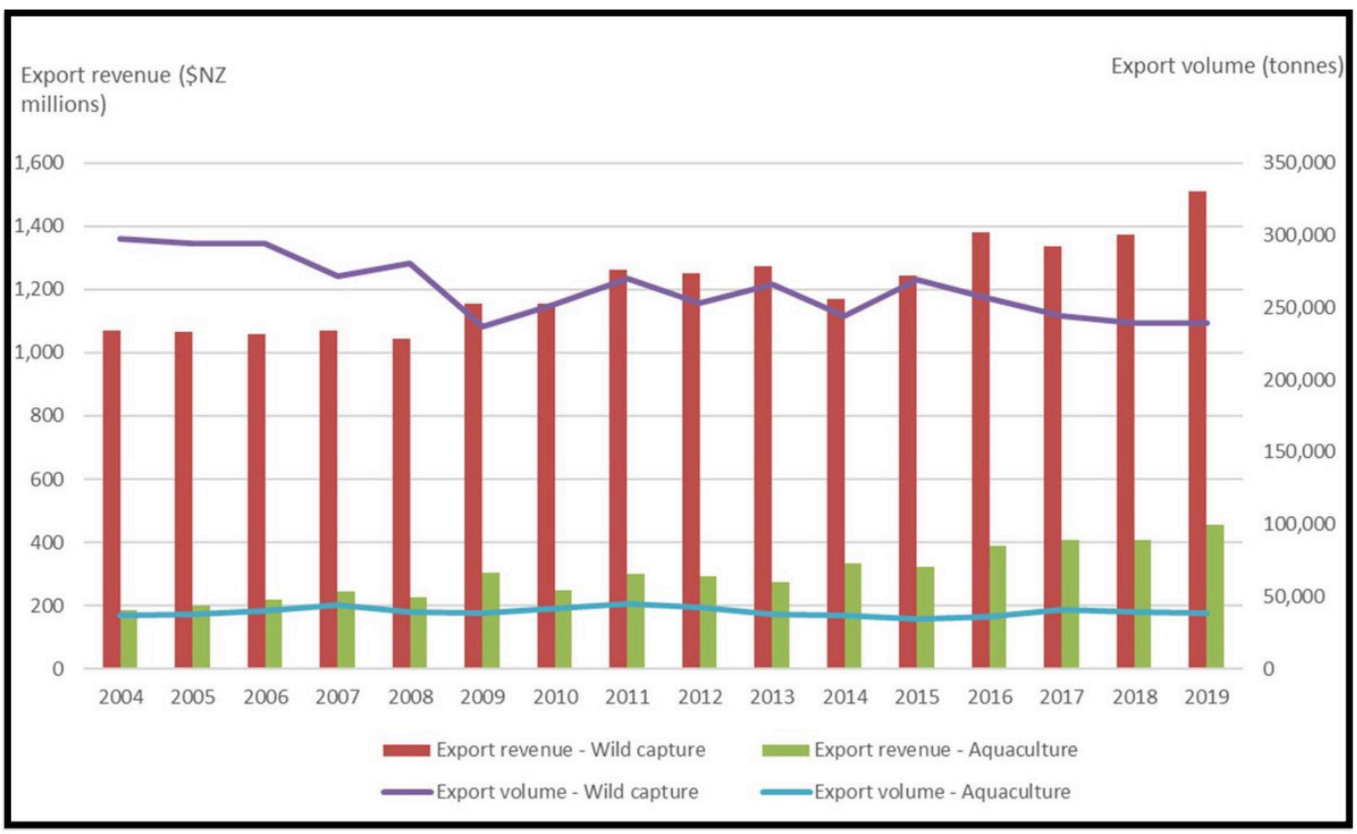
Export destinations

Export is critical for any fishing company in Aotearoa New Zealand. As Brydon and Dana (2011, p. 215) detail:

> [The] nature of the seafood industry in New Zealand has meant that it was not a decision to enter foreign markets, but a necessity, due to the small domestic market, and the capital intensity of the industry, meaning that to reach any sort of economies of scale meant producing more than the domestic market demanded.

In terms of export destinations, the seafood sector aligns strongly with the wider primary sector. Aotearoa New Zealand exports seafood to over a hundred countries. MBIE (2017, p. 5) provides a good overview: "Broadly speaking Western markets account for about half of value and the growing Asian market the other half." In terms of the growing Asian market, one player stands out. "From, 2000 onwards," Stringer et al. (2011, p. 166) detail, "China began to emerge as a key export market for the New Zealand seafood industry, taking 3.7% of all finfish exports." China consumes more seafood than

Figure 6. *Export revenue of wild capture and aquaculture for Aotearoa New Zealand*



Note: Lewis et al. (2020, p. 34).

Europe, North America, South America and Africa combined and one third of all seafood consumed globally. By 2008, exports of finfish to China were 15.2% of total catch, positioning it as the second largest export market after Australia (Stringer et al., 2011). Australia remains by far the most important destination for chilled fish, even though total seafood exports have fallen fast after initial strong growth from Australia (Norman, 2016, p. 6). Apparently, "this was as much the result of the type of Australian customers purchasing fish from New Zealand, who had a preference for chilled fish, as it was a result of close proximity" (Norman, 2016, p. 6). As Norman (2016, p. 6) notes, this "raises the question of why, when the challenge is not necessarily geographic distance, New Zealand has not been able to increase higher value chilled fish exports to other countries more." Japan, on the other hand, had declined during the same period, going from 25.4% of all finfish exports in 2000 to 10.8% in 2008 (Stringer et al., 2011). China looms large for Aotearoa New Zealand seafood, seeing exporters focused on this one market. "Increased market concentration will continue to raise the risks of exposure to a handful of key markets," Norman (2016, p. 2) warns, before noting that "Given the growth in lobster exports to China, and Australia's dominance in the chilled/fresh fish category, this increasing market concentration is unlikely to reverse soon." Because Aotearoa New Zealand does not 'create demand' "the pattern of countries to which New Zealand exports most of its supply is dictated more from demand than those psychically similar, and these are largely more affluent countries that demand high quality seafood" (Brydon

& Dana, 2011, p. 215). As it stands, Aotearoa New Zealand does not actively seek out markets but rather largely acquiesces to demand. As (Bryden & Dana, 2011, p. 215) note:

> Demand for seafood far exceeds supply, and this fact has dictated to where the supply goes. Along with the clean green image that New Zealand enjoys, there is much demand for New Zealand seafood, and this has meant that relationships have been established because demand for New Zealand's product, more so than New Zealand creating the demand.

There are some obvious regions and countries where this demand is growing, with "key seafood consuming countries (e.g. South East Asia (SEA), China)… experiencing growing incomes leading to increased ability to pay for (or demand) more seafood. This situation has supported prices" (MBIE, 2017, p. 5).

Categories and species

In terms of product categories and species, there are several different key aspects to explore. Overall, in the period between 2010-2015, the average annual figures across key species in terms of catch value in the different subsectors were:

> Deepwater: Hoki (38 percent); Ling (13 percent); Arrow Squid (11 percent); HMS: Southern Bluefin Tuna (32 percent); Albacore Tuna (23 percent); Skipjack Tuna (20 percent); Inshore: Snapper (15 percent); Blue Cod (9 percent); Tarakihi (6 percent); Shellfish: Rock Lobster (63 percent) and Paua (28 percent)" (Williams et al., 2017, ii).

MBIE (2017, p. 12) provide a similar breakdown:

> Total global cross-border seafood trade is spread across a wide range of products – White fish (US$38b), processed seafood ($23.9b), salmon ($15.1b) and prawns ($14.7b) stand out for size – Squid, salmon, lobster and processed seafood stand out for their growth in demand over the past five years; white fish has shown slight growth in overall value despite declining volumes.

"Per capita consumption of wild capture seafood has been flat-to-declining globally, due to overfishing and population growing faster than capture quantity" (MBIE, 2017, p. 5). Aotearoa New Zealand is a relatively big player in the shellfish export industry, though this is largely due to limited competition. "On a global basis," MBIE (2017, p. 6) explains, "most shellfish are produced and consumed locally and very little crosses borders. New Zealand produces mussels and oysters in quantity, and smaller amounts of abalone/paua." Globally only around one in eight mussels produced crosses a national border, though Aotearoa New Zealand does compete with a wide range of regional players by market (MBIE, 2017). Chile is an emerging multi-regional threat in mussel export. Only "1% of global oyster production crosses borders; global production is flat except for China which is increasing production massively" (Norman, 2016, p. 7). Another area that Aotearoa New Zealand excels in is crustaceans, with exports surging 243% in 14 years compared to world crustacean export growth of 115% (Norman, 2016). Aotearoa New Zealand has a limited presence in the salmon export market. "Potential growth in the aquaculture industry involves species such as eels, whitebait, snapper and

seahorses" (Pavlovich & Akoorie, 2010, p. 380).

Competition insight

Aotearoa New Zealand is one of the most trade dependent fisheries sectors in the world, with only Iceland exporting more of its catch, it is also one of the least subsidised internationally (Jeffs & Liyanage, 2005). As MBIE (2017, p. 5) explains:

> NZ achieves a 7% share of the temperate Southern Hemisphere (S.H.) wild catch. New Zealand competes in the first instance with other colder water Southern Hemisphere countries, primarily Australia, Chile, Argentina, and South Africa. Secondarily, this group compete with Northern Hemisphere colder water fisheries, including Norway, Canada, Iceland, USA/Alaska, UK/Scotland.

Consumer insight

Key to developing a strong value chain is understanding consumers as they are the key determiner of value in a product (Saunders et al., 2016). There are a number of key consumer trends that bear examination: premium, unique, healthy, sustainable, and sub-national.

Premium products

There is "growing demand for premium products", in particular, "Consumers want chilled or fresh fish rather than fish fillets or undifferentiated frozen fish" (Norman, 2016, p. 12). Across most types of products, consumer preferences in premium seafood are for fresh chilled product. This is a strong global trend (Norman, 2016). "Globally," as Norman (2016, p. 12) explains, "fresh and chilled fish exports grew, 204% between, 2000 and, 2014, while from New Zealand, exports grew 130% in US dollar terms." Still, however, chilled fish only accounted for around 15% of all finfish export value from New Zealand suggesting there is much more room for growth and value add. As Stringer et al. (2011, p. 170) explain, "some New Zealand companies have clients who insist they will only purchase fish processed in New Zealand and, as such, are willing to pay a premium, whereas other clients simply want a cheaper price regardless of where processing occurs." The key is finding and targeting the first set of customers. As MBIE (2017, p. 5) detail: "Fresh seafood is a highly perishable product and the highest value products are often those sold fresh (unlike some other foods). Bulk fish for further processing is also a key channel for NZ." As an added incentive, in some cases chilled fish is cheaper to produce than fillet or frozen fish (which requires blast freezing), yet commands a higher price (Norman, 2016). This essentially means greater returns can be achieved from both ends, lower production costs and higher pricing – all that is required is identifying markets and consumers and developing the necessary chain connections and attendant marketing and branding.

Healthy food

Another interesting shift in consumer wants and needs has been the transition to healthier food. This has been driven by both increasing scientific research showing the health benefits of seafood as well as the

wider popularity of a range of subcultures and movements (MBIE, 2017). Seafood has a great advantage here as it is generally understood to be a healthy. "Seafood is seen as a healthier protein option. As a fat-free alternative to, for instance, red meat, its benefits have long been espoused" (Norman, 2016, p. 12). This is backed up by Conte et al. (2014, para. 5), who note that:

> Fish meat is perceived as a healthy food and as an alternative to other meat, such as red meat, as a source of proteins. Overall, consumer's decision process when purchasing seafood involves some variables; generally, people consider high biological value proteins, vitamins and some minerals content and low content of saturated fat.

While it is viewed as healthy, in some cases "knowledge about the specific nutritional and health benefits of fish consumption does not appear to be strong among the population" (Mennozi et al., 2020, p. 12).

In fact, the health benefits of seafood are one of the strongest influences on consumer buying decisions. As Mennozi et al. (2020, p. 2) note:

> [The] nutritional aspects of fish and the related health effects are among the most important factors affecting consumer choices. Concerning the health benefits, the high omega-3 fatty acid and protein contents, as well as the low fat content, are generally associated with the consumer's perception of fish and seafood as healthy foods.

In a survey of three European countries (France, Poland, and Spain) 28% of fish consumers were driven largely by the health benefits (Mennozi et al., 2020). There is also a similarly driven demand for health and nutritional supplements, with a number of seafood products offering popular or potentially popular products, with the most obvious example of the former being omega fat supplements (Lewis et al., 2020; Norman, 2016).

In terms of the types of consumers who buy seafood for its health benefits, Olson (2004, p. 85) found that "people with high moral obligation [they feel the need to feed themselves and/or family healthy food] and who are involved in healthy eating are loyal seafood consumers. For this reason, families with children and elderly people are two important market segments for the seafood industry." Likewise, some studies have explored the premiums consumers would pay for healthy seafood. Mennozi et al.(, 2020, p. 12) found that:

> [I]n Italy the premium consumers are willing to pay for pangasius [large shark catfish] with nutrition and health claims is €0.96/kg, whereas for salmon is €3.19/kg, resulting in a percentage premium above the average market price of, respectively, 17.1% and 21.1%. In France the relative premiums are, respectively, 27.2% and 27.5%.

Sustainable seafoods

Sustainably sourced seafood is growing in demand across certain consumers. As Maesano et al. (2019, p. 361) note, "Research finds that consumers are willing to pay a premium for ecolabeled fish products." In particular, as they (Maesano et al., 2019, p. 361) continue:

> European consumers supporting eco-labels tended to be women, young, low-income and highly educated consumers are more prone to be environmentally oriented. Support for eco-

> labelling was also found to be associated with other product attributes such as freshness, origin and production method.

A survey carried out in 2007 across five European countries (Belgium, Denmark, France, Italy, and The Netherlands) found that 82% of respondents agreed that environment-friendly fish catch practices should be differentiated with a specific eco-label and supported by the introduction of a specific eco-labelling policy in the seafood sector (Maesano et al., 2019).

The demand for sustainably produced seafood is growing in some markets. "Demand for sustainable product varies by market. There is increasing demand in Western markets (Europe/North America), for sustainable products often driven by retailers (and vocal activists). However, there is currently low/no demand in Asian and developing markets for sustainability" (MBIE, 2017, p. 5).

Various studies reveal the added attractiveness of sustainable products, and the premium customers are willing to pay for them. In one, UK eco-labelled seafood from a sustainably managed fishery had up to a 7% higher probability of being chosen by participants (Maesano et al., 2019). Another found that consumers in the UK are ready to pay an average premium of 22% for environment-friendly farmed salmon (Maesano et al., 2019). Another study found:

> That a 0% [ie, no extra from standard cost] price premium the probability of choosing eco-labelled seafood was 74% for Norwegian consumers and 88% for U.S. consumers, while at a 50% price premium, the probability of selecting eco-labelled seafood de- creases to 32% for Norwegians but only to 68% for U.S. respondents (Maesano et al., 2019, p. 361).

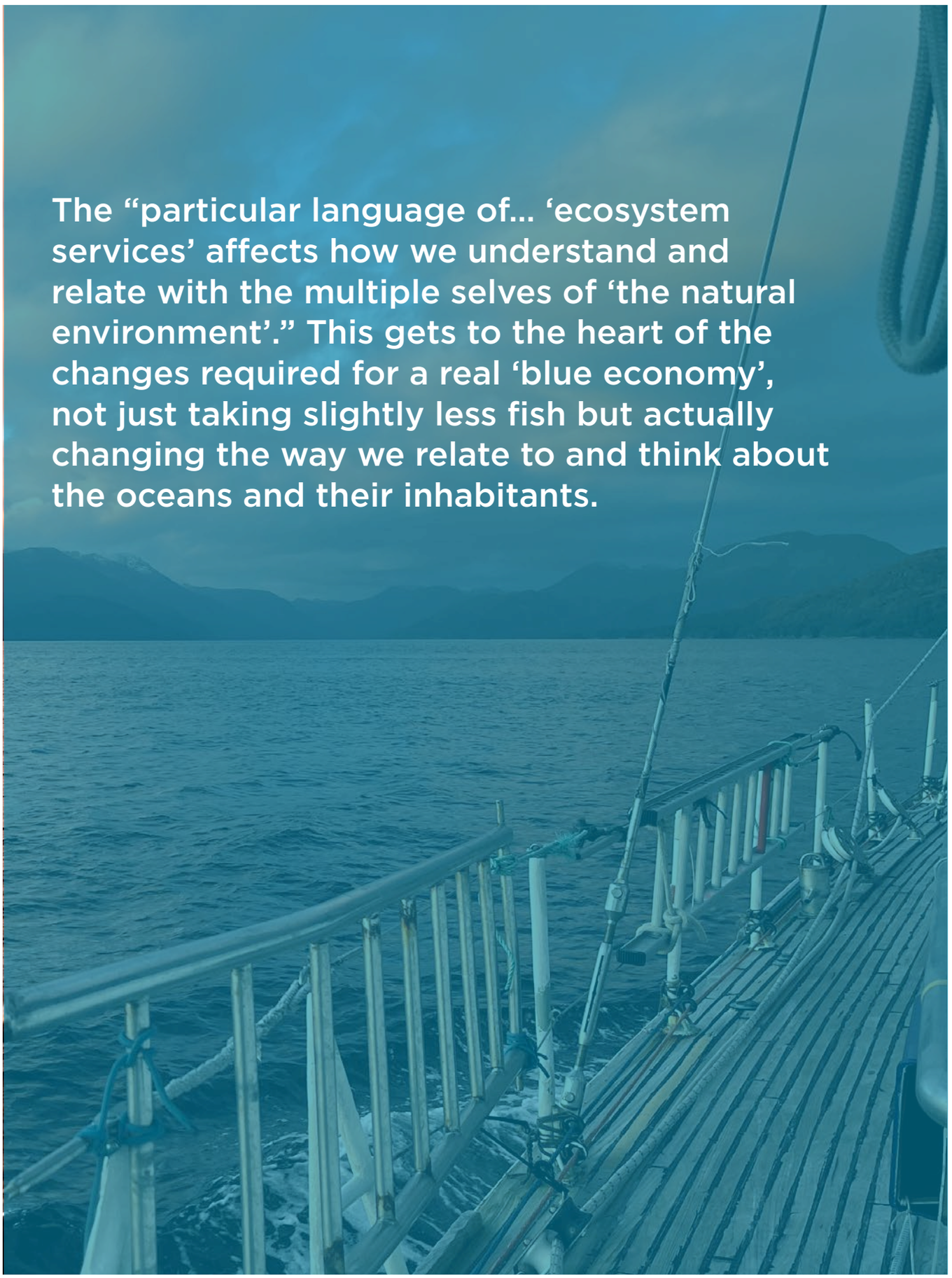
Interestingly, consumers expressed a higher interest for environmental issues than for fishes welfare when buying these food products, meaning they had a higher concern about a healthy world than in their own health (Conte et al., 2014). This aligns with a finding by Mennozi et al. (2020, pp. 2–3), who note that "most consumers associate sustainability labels on food products with aspects of environmental protection rather than ethical issues; this also translates to a lower willingness to pay (WTP) for social benefits of sustainability rather than for ecological benefits."

Sub-national consumer segments

Often markets are viewed at the national level, though this fails to take into consideration the considerable variation within nations. For example, as Norman (2016, p. 12) explains,

> [T]he changing demographics of New Zealand, with strong Asian migration, [are posited] as a reason for stronger demand for better premium seafood products and a more informed purchaser here. In Australia, where more than 50% of New Zealand's chilled and fresh finfish goes, the traditional role of the Greek and now the Asian community were once again tipped as reasons for strong demand.

As well as ethnic subsections, there are a range of other possible subnational markets, including pescatarians, or vegetarians who sometimes eat fish, people who follow paleo diets, and a range of other subcultures.



The “particular language of… ‘ecosystem services’ affects how we understand and relate with the multiple selves of ‘the natural environment’.” This gets to the heart of the changes required for a real ‘blue economy’, not just taking slightly less fish but actually changing the way we relate to and think about the oceans and their inhabitants.

Tracing, assurance, and certification

Tracing, assurance, and certification are a critical components of creating a value chain providing retailers and consumers with third party verified information about the origins and production of the product. The "destination market for many seafood products plays an important role in driving businesses and companies to adopt traceability" (Sterling et al., 2015, p. 212). There are a number of examples of individual firms either creating their own tracing, assurance, and certification or using an international accreditation. However, as outlined previously there is no single 'Aotearoa New Zealand seafood' overarching scheme. As Sterling et al. (2015, p. 208) explain:

> [S]eafood industry is experiencing significant change, with increased ecological concerns and environmental risks, evolving attitudes among consumers and industry stakeholders, changing consumer behavior, rising seafood demand, shifting market power, growing importance of aquaculture, concerns about seafood fraud, retail and foodservice demands driving increased investment, and increasingly stringent regulations pertaining to the supply and marketing of seafood.

Seafood companies "recognize that transparency and traceability are critical to brand equity, risk mitigation, food safety, and consumer confidence" (Sterling et al., 2015, p. 210).

An example of a firm creating its own certification is Okains Bay Longline. They market their products using 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" (Lewis et al., 2020, p. 59).

In terms of international accreditation, as (Lewis et al., 2020, pp. 58–59) detail:

> 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.

Alongside the MSC system, sits the Aquaculture Stewardship Council (ASC) accreditation. Moana New Zealand sought and achieved ASC certification for its abalone [paua] farm, an accreditation that covers responsible aquaculture production, including best farming practice and environmental responsibility (Lewis et al., 2020).

While these are also useful ways of adding value, in some respects a pan-Māori or national scheme would provide greater traction in international markets. As Norman (2016, p. 12) states:

> Joint certification and/or a marketing campaign that emphasises the premium value of New Zealand seafood products may be more effective than the current fragmented approach. The opportunity is not to replace independent brands with a single brand, but rather a consistent labelling and marketing approach that will help export consumers understand the value of New Zealand-caught or farmed seafood.

There are certain moves in the right direction. Seafood New Zealand has established a promotions campaign based around six pledges. These pledges "address concerns from social justice to environmental performance underpinned by a unifying commitment to honesty and integrity." (Lewis et al., 2020, p. 60). There are six pledges: 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 (Lewis et al., 2020). In reference to the development of a government assurance scheme, Telesetsky (2016, p. 104) notes that:

> [A] 'sustainability assurance' to trading partners receiving wild fish or other sustainable New Zealand products would represent a new direction for MPI but has the potential to broadly raise the standards of industry performers across a number of fisheries to achieve best practices. A government assurance, in theory, should send a powerful message to external parties about the quality of production related to New Zealand fisheries while also increasing the investment of domestic industries in best available sustainability practices.

Such a scheme would shape norms within the sector, with potential for leaders to "provide a pathway for laggards that will strengthen the overall credibility of New Zealand's seafood industry", as well as serving as a powerful branding and marketing tool in international markets (Telesetsky, 2016, p. 107).

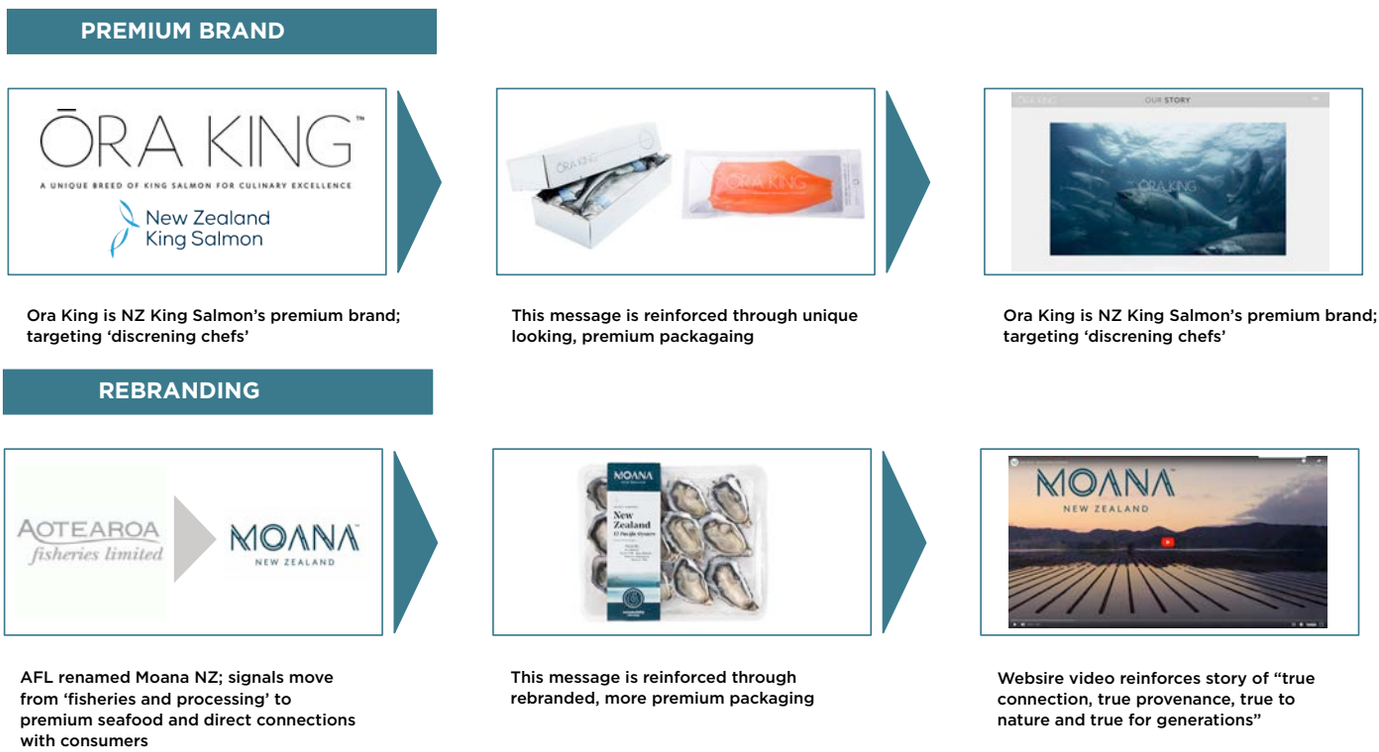
Branding and marketing

Branding and marketing are critical components of turning a supply chain into a value chain as they are the way in which the worth of the product is communicated to the final arbiter of value, the consumer. A number of individual companies have shifted from commodity supply to the creation of their own brands with marketing campaigns. As MBIE (2017, p. 69) notes, "New Zealand seafood firms are also investing in new and improved marketing emphasising 'premium' and sustainable themes." They provide two examples, are pictured in Figure 7 (Note: MBIE. 2017, p. 69).

With regard to seafood marketing, Bess (2006, p. 374) explains that:

> The purpose of a firm's marketing capability is to apply specific resources to markets in ways that provide sustainable and appropriable benefits for the firm. Once the seafood firms attract customers with the assurance of product supply, provided to them by security of tenure in access rights, the firms have the opportunity to build long-term customer relationships by putting time and effort into thoroughly understanding customers'

Figure 7. *Marketing campaigns for Aotearoa New Zealand seafood*



Note: MBIE. (2017, p. 69).

> requirements and how best to meet them. This approach allows the firms to position their products away from low value, low-price commodity markets and towards higher quality and higher valued product markets.

Branding and marketing is the best option for wild capture companies to increase profits. As Norman (2016, p. 2) explains:

> The prices received for New Zealand seafood will need to rise. In our view, the opportunity to achieve higher prices lies in collectively marketing New Zealand's sustainable fisheries, to introduce new species to the market, and to steer customers away from generic 'whitefish' frozen and fillet exports and toward fresh and chilled product.

Māori fishing companies have the added advantage of the international appeal of Māori culture. Te Puni Kōkiri (Dominion Post, 2009, para. 3) commissioned a report that found there is increasing demand for all things Māori, especially from overseas, noting "[i]n simple terms, it appears to be cool to be Maori, and it is eagerly sought globally." Being Māori is a powerful point of difference, as Thomson (2015, p. 4) explains:

> The one thing that nobody but us can claim – New Zealand's one guaranteed point of difference, is our Indigenous culture, Maori. Maori is 100% New Zealand. No other country in the world can claim the culture, the people and its unique and spiritual ways. New Zealand has a great story. When it comes to branding our products, we have the ability to tell the people of other nations about our rivers, mountains and our land, but if we combine the New Zealand story with our Maori culture we have the ability to tell the people about our awa, maunga and whenua. This creates a deeper and more meaningful story while also adding some creative licence to brands and marketing strategies.

“Māori branding has always been an integral part of Māori culture.” Māori already have ‘strong brands’ as traditional “Māori cultural elements such as imagery, language, symbols, colours, designs” are the core of contemporary branding initiatives.

(Harmsworth and Tahi, 2008).

Māori also have strong traditional 'branding' aspects to utilise. Harmsworth and Tahi (2008, p. 3) explain that "Māori branding has always been an integral part of Māori culture." Māori already have 'strong brands' as traditional "Māori cultural elements such as imagery, language, symbols, colours, designs" are the core of contemporary branding initiatives (Harmsworth and Tahi, 2008, p. 1). While these traditional cultural attributes of symbols, words and imagery help, they are no 'magic bullet' when it comes to success: "It doesn't happen easily, and there are many other aspects that need to be in line as well. A brand won't sell a product, it will tell a story that will help the product sell itself" (Thomson, 2015, p. 2). That said, as Baltus (2020, p. 9) notes:

> Previous research investigating Indigenous brands has shown that Indigenous branding gives valuable cultural distinctiveness to a brand, and potentially creates a platform for organisations to charge a premium price.

While there has not been much research into the power of Indigenous branding in general, or in the seafood sector specifically, there has been more in tourism, which fits with a whakatautika solution discussed below. As Baltus (2020, p. 9) notes, "Given that Indigenous cultures are often a focal point drawing travellers into particular tourist destinations, tourism literature offers a breadth of insights into both Indigenous branding and Indigenous tourism." Hinch and Butler (as citedin Baltus, 2020, p. 9) explain that "tourism activity in which Indigenous people are directly involved either through control and/or by having their culture serve as the essence of the attraction."

Thomson (2015, p. 13) gives Ngāti Porou Seafood Group (NPSG) as an example, noting that:

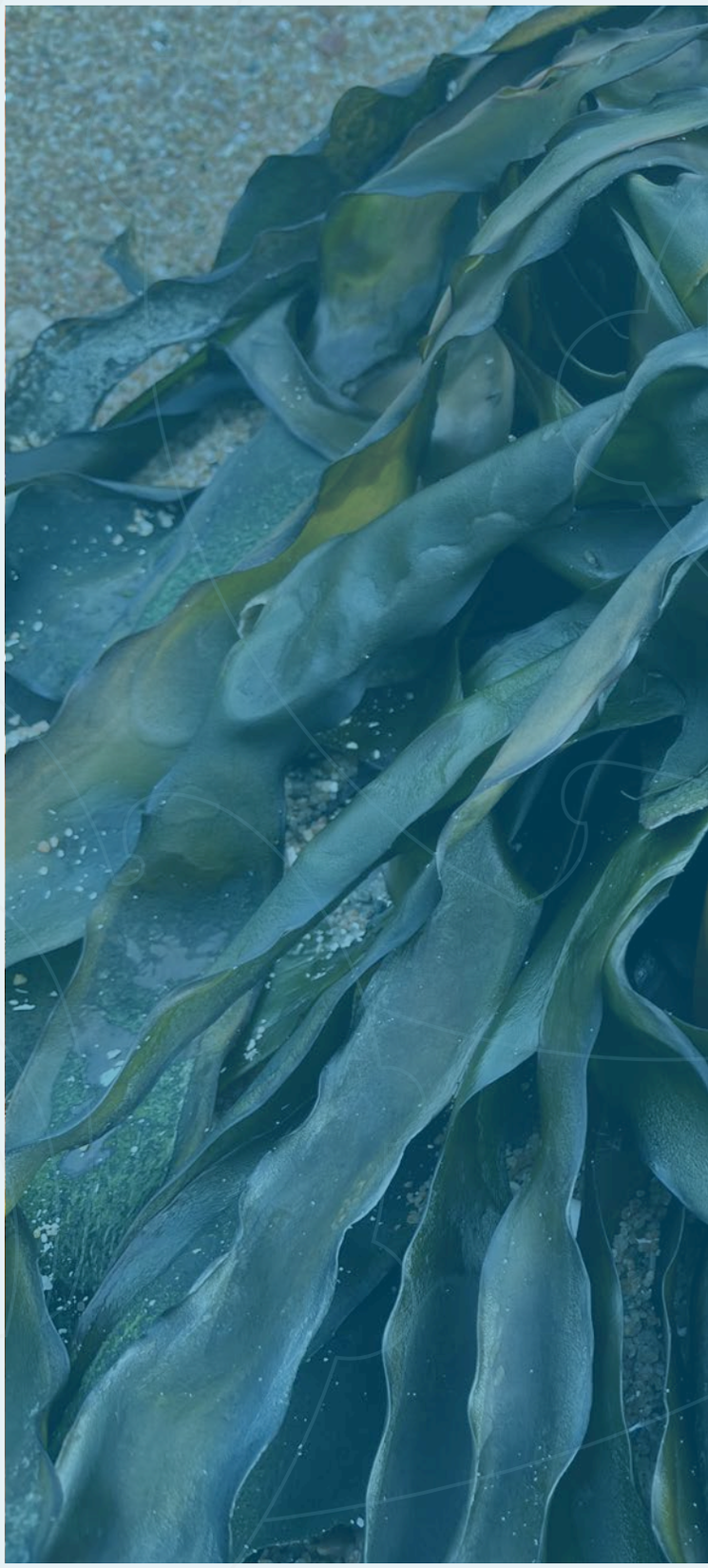
> Indigenous character is important to Chinese and Japanese people, they relate to and enjoy the Maori culture and stories that come with the seafood products. The stories and songs that come through in the NPSG brand give them a competitive advantage over mainstream companies. One of the success stories from within NPSG is the smoked fish range… NPSG have two types of smoked fish. The premium product "Ahia" and the lesser quality Real Fresh. One is about adding value while the other is about moving volume… The Ahia website tells the story of the people of Ngati Porou, the descendants of Maui, the greatest fisherman of them all who fished up Aotearoa. It tells of their people, their passion and the lifestyle and culture of the rohe (area). The Ahia website is a complete package. It describes the "art of smoking" and the health benefits of eating fish. It tells the story behind the brand, while giving the perception of being a quality product of value and captures the reader into wanting to see, taste, feel the product and most importantly to buy it.

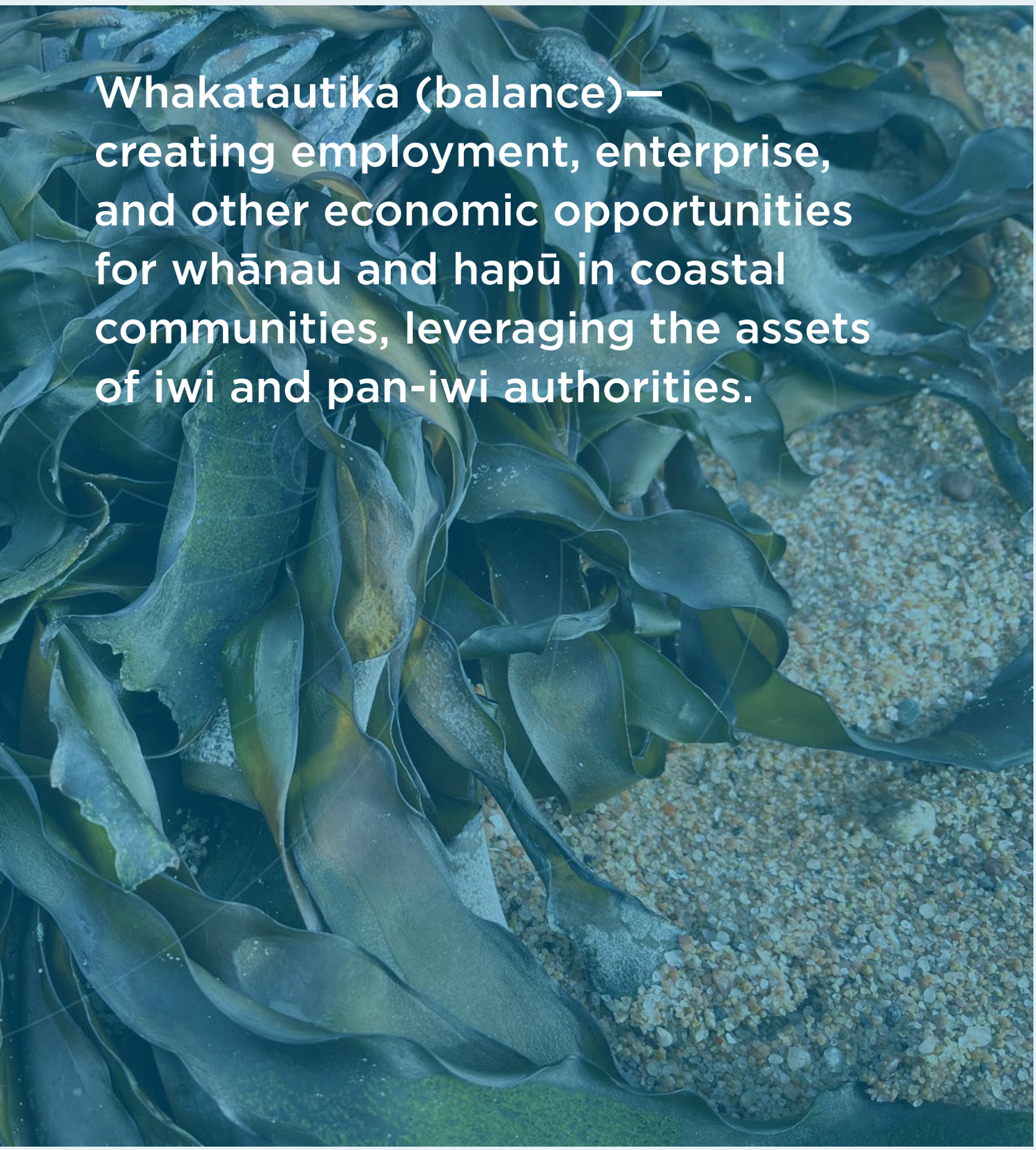
As noted, branding and marketing are empowered through tracing, certification, and assurance. As Lewis et al. (2020, p. 82) note, these campaigns:

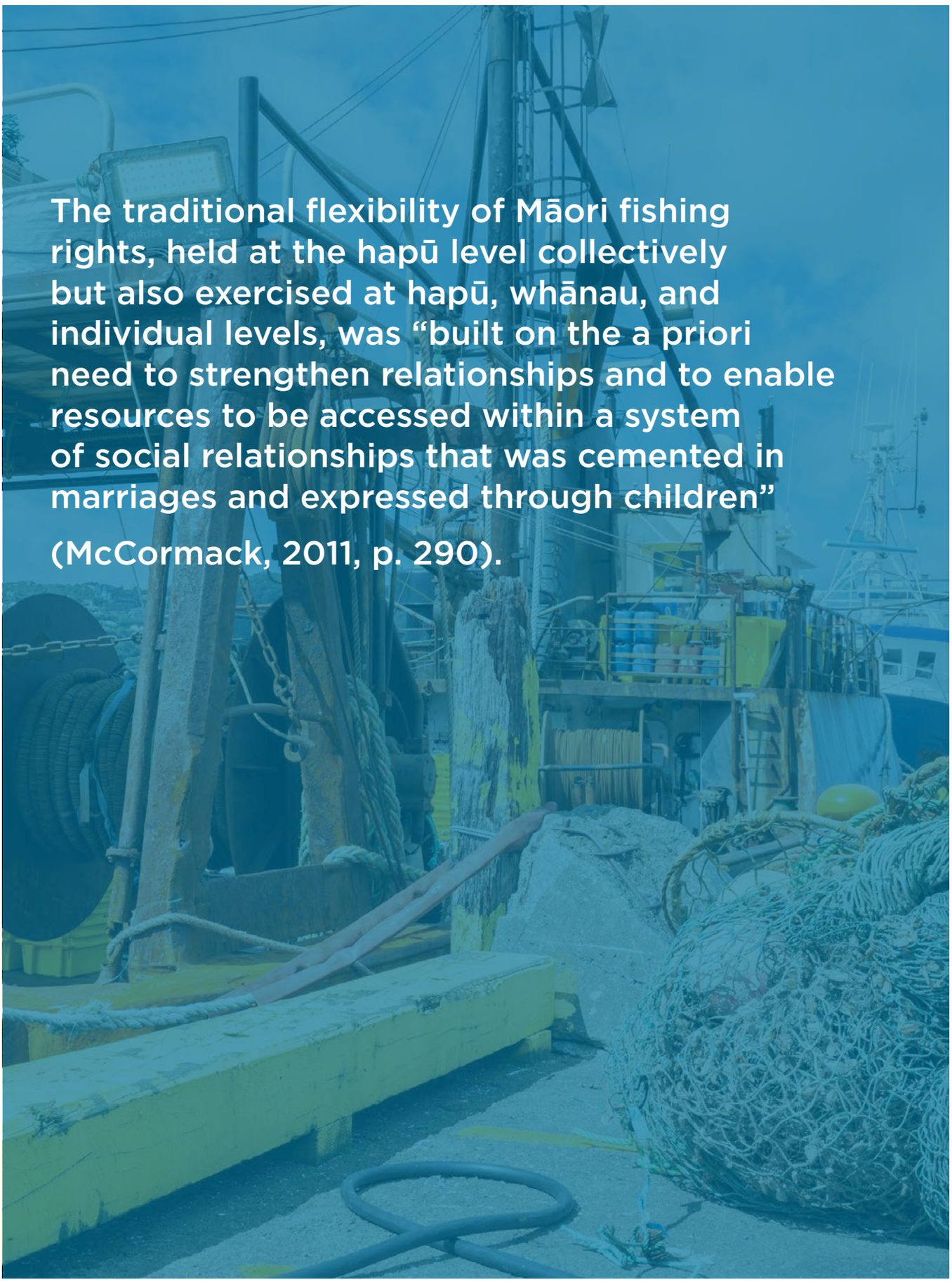
> [P]romote and create distinctiveness values from narratives of provenance and associated credence claims. These are carried in various texts from social media to corporate promotions with high-end production values such as Seafood New Zealand's 'Promises' campaign. The narratives are steeped in principles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

3. Whakatautika—Balance

The fisheries treaty settlements process has seen the consolidation of political and financial capital in the Māori marine economy at pan-iwi and iwi scales. While this was a necessary tool to engage in Crown negotiations these structures are contrary to traditional cultural forms, where hapū were the primary political and economic unit. This has led to the centre-periphery challenge, whereby empowerment (assets and political influence) is sought at hapū and whānau scales to manage marine resources, access investment to support whānau fishing enterprises, generate employment, and other multipliers in coastal communities. Hapū and Māori commercial entities recognise a need to tackle the decentralisation challenge to improve the efficiency of resource utilisation and more fully indigenise the blue economy. New models can assist in this process, particularly in the case of small to medium sized iwi, given they may be empowered to operate independently and in partnership with hapū and whānau fishing enterprises. Models and methods, drawing upon traditional approaches and contemporary global insights, may be used to bridge the Māori corporate-community divide and encourage economic planning and investment that focuses on community multipliers in Māori coastal communities. Through such an approach, Māori marine economy internal competition can be overcome and increased cooperation encouraged through new business models that enable innovative actors to form mutually-beneficial partnerships with Māori communities. In this section the causes of this imbalance will be explored, before some of the potential solutions that might deliver whakatautika will be outlined.




Whakatautika (balance)—
creating employment, enterprise,
and other economic opportunities
for whānau and hapū in coastal
communities, leveraging the assets
of iwi and pan-iwi authorities.



The traditional flexibility of Māori fishing rights, held at the hapū level collectively but also exercised at hapū, whānau, and individual levels, was "built on the a priori need to strengthen relationships and to enable resources to be accessed within a system of social relationships that was cemented in marriages and expressed through children" (McCormack, 2011, p. 290).

3.1 Challenges

QMS and wider jurisdictional issues

The implementation of the QMS created the dynamics that drove consolidation and concentration at iwi and pan-iwi levels. In particular, the decision to allocate quota to MIOs and the wider industry consolidation that the QMS has driven can be seen as the two most significant outcomes, alongside a range of other more particular outcomes of the legislation.

Mandated Iwi Organisations

The establishment of MIOs generates two sets of issues in terms of creating whakatautika. Firstly, due to settlement requirements MIO need to operate with corporate management structures and capitalistic objectives and secondly, that the inherently centralising, corporatised structure of iwi gaining commercial rights to fisheries has a number of economically and socially imbalanced outcomes.

The need for iwi to adopt 'western corporate principles' is a critical component of the imbalance between centre and periphery. Following the 2004 Settlement, claimants had to meet the criteria specified under Section 130 of the Māori Fisheries Act 2004, which states that iwi must form a mandated iwi organisation (MIO) that will hold and manage the assets transferred to them on behalf of the iwi (Lock & Leslie, 2007). The requirements TOKM outlined for MIO were that an iwi "can choose whatever legal structure they wish provided it meets the minimum standard set by Te Ohu Kai Moana" (Webster, 2002, p. 352). Ultimately though, as Webster (2002, p. 352) states, despite the apparent freedom this might suggest, "for traditional Māori ways, the crucial words are 'legal structure' and 'minimum standards'." For a MIO to manage the fisheries asset package in accordance with the law they need to invest the assets, monitor their performance, extract a dividend and make reinvestment decisions. In other words, they must meet "certain 'structural' criteria of capitalist modernity" (Webster, 2002, p. 352). Webster's conclusion is echoed by De Alessi (2012, p. 406), who states that "the criteria for becoming eligible for direct allocation (becoming a 'mandated iwi organization') primarily involve adopting capitalist, corporate management structures." "Māori who undertake Treaty of Waitangi settlement processes are forced to adopt forms of organisation that are rooted in Western legal traditions" and MIOs are, in the words of McCormack (2018, p. 274), "closely aligned with maximising the chances of a successful transfer to market capitalism."

The traditional flexibility of Māori fishing rights, held at the hapū level collectively but also exercised at hapū, whānau, and individual levels, was "built on the a priori need to strengthen relationships and to enable resources to be accessed within a system of social relationships that was cemented in marriages and expressed through children" (McCormack, 2011, p. 290). As (McCormack, 2011, p. 290) explains:

> The subjugation of hapu to iwi was a pragmatic response to the need for an alternative, more centrally organized, political structure through which to confront the contingencies of colonialism. This understanding of the historic

> centrality of hapu is largely uncontested by scholars of Maori society. It is also indisputable that hapu identities remain central to contemporary Maori society.

Compared to the traditional structures, where hapū had far more independence, MIO are an inherently centralising authority. Much of this has been covered in pāhekoheko, as it closely relates to fractured governance as well. However, as well as having political outcomes, it has also resulted in economic and social consequences. McCormack (2018, p. 278) provides an example of how the MIO system has led to less local involvement in fishing:

> In the fisheries settlement, Waikato Tainui Fisheries Ltd, the MIO of the region's largest iwi, was granted the quota that they now lease as a package, typically to large consolidated and non-local companies, the dividends from which partly trickle down to beneficiary marae. It was the incongruity of living by the sea, high rates of local unemployment, the inability to generate an income from an ancestral resource and fishing practices and policies that were perceived to be culturally irreverent and environmentally destructive that most frustrated local Māori. Tex Rickard… described the sea in Whaingaroa as formerly 'the people's food basket, the mainstay of local diets'. The pre-quota local commercial fisheries venture, Hartstone fisheries, he explained, had encouraged Māori employment; the company had also gifted much fish to local Māori families. Hartstone fisheries was sold simultaneously with the implementation of the quota system. The food basket, he decried, was now depleted. A result of the marketisation of fisheries and the imposition of national regulations that were unable to comprehend variations in local ecosystems.

In reference to the analogy between preventing fisheries assets alienation and lessons learnt from land loss, Castle (2015, p. 61) notes that there was a "need to reconcile the scale of quota ownership with the economic scale of quota utilisation." However, aligning scale of quota and quota holder to ensure economic utilisation may have prevented alienation, and in some ways economic outcomes, it has not resulted in widespread economic development at the local level.

The MIO system creates tensions between central and periphery and short and long term economic outcomes, an issue also identified in the pāhekoheko theme. Speaking of settlements and MIO in general, Barr and Reid (2014, pp. 217–218) explain:

> [A] number of Māori tribes have received compensation in land, cash and others assets from the government of New Zealand for injustices committed during the colonization period. The majority of these assets have become centralized within corporate structures designed to protect and grow the asset base on behalf of tribal constituents. Because control over resources has traditionally been situated at the whānau (family) and hapū (sub-tribe) levels, this has caused political tensions within tribes with these centralized corporate structures being seen by some as the imposition of an alien structure on traditional political and economic forms.

As Song et al. (2018, p. 290) explain, the iwi mandate to maximise value from quota means that quota:

> [A]s a mechanism to raise Maori well-being is therefore ineffective in addressing contemporary exclusion, as it is rather geared

> towards subsidizing families of those excluded historically from fishing and future fishers as well as funding iwi-wide social and cultural development initiatives.

As they (Song et al., 2018, p. 290) continue, the "possibility for iwi leaders to address fishers' exclusion is constrained by the same competitive market pressures that incentivize non-Maori quota owners to pay fishers low price for fish." As McCormack (2010, p. 29) explains:

> There is no necessary link between the benefits secured under the commercial settlement and the actual activity of fishing… The option to sell or lease quota to large companies is being taken up by many iwi; hence, quota has become more or less synonymous with an investment good as opposed to a tool that enables community participation in fishing activities.

Consequently, as she notes in a later article (McCormack, 2017, p. 42) the "trickledown effect to individual Maori is virtually non-existent." Memon and Kirk (2011, p. 3) come to a similar conclusion: "In retrospect, with many iwi subleasing their quota, the opportunities for Maori to gain employment in the fish capture and processing sector are currently low." Unsurprisingly, since the 2004 Act "resistance to fishers' exclusion has primarily occurred in negotiations between Maori fishers and tribal leaders" (Song et al., 2018, p. 290). Not only did the creation and constitution of MIO create a centre-periphery tension but it has meant that iwi are now seen as the ones responsible for this tension. McCormack (2021, p. 197) has more recently made the connection between MIO and the imbalance between the centre and periphery, also connecting it to the increasing dependence that the apparent 'independence' of settlement has created:

> In the three decades since the deed was formalised, however, Māori property in fisheries has grown while wage labour has remained sorely lacking. This disparity is mirrored in divisions between post-settlement, asset-holding Māori entities and 'grass roots', coastal subtribes (hapū), evoking questions over the type of independence formally achieved.

The intertwined nature of the political fracturing and the economic and social imbalance is clear in Song et al. (2018, p. 290) analysis of the situation:

> Although it is now accepted that the level of iwi is the primary terrain upon which narratives of fishers' exclusion are to be articulated and rectified, tribal leaders find themselves in a difficult, if not impossible, position to do so. Most Maori individuals are genealogically affiliated and politically represented by mandated iwi representatives and corporately structured iwi organizations. Hence, tribal leaders need to represent the concerns of marginalized fishers to ensure that they are given full opportunities to sustain their livelihoods from fishing. Despite this, as the authorities who mainly employ quota for investment purposes to benefit not only fishers but the tribal population as a whole, their ability to address fishers' contemporary and historical exclusion seems severely limited.

This is related to the division between commercial quota for iwi and managing customary quota for hapū, "the distinction between commercial and customary Māori fisheries has exacerbated hierarchies between iwi and hapū" (McCormack, 2021, p.

203). As McCormack (2011, p. 290) outlines:

> The merging of runanga and iwi concerns exacerbates existing tensions. These often express themselves as an opposition between tribe (iwi/runanga) and hapu interests, where tribe (iwi/runanga) represents corporate, capitalist-orientated enterprise norms and disengagement, and hapu the lived experience of tribal members. Perhaps the institution of runanga is not unusual in this regard.

Industry consolidation

The current QMS system is essentially geared towards industry consolidation, as outlined above. As well as pushing the sector towards a commodity focus this also results in a lack of balance within the sector. The core laws and organisations that govern and manage fisheries generate constraints on Māori finding balance between centralised control and localised development, as they have seen Māori fisher exclusion from the outset of the QMS. Furthermore, these issues themselves are often tied up with the tension iwi experience between short and long term outcomes – discussed below.

The same dynamics that caused industry consolidation following the introduction of the QMS also saw many Māori fishers pushed out of the sector. These are the 'push-pull' outcomes of the management regime. "At the time of ITQ system implementation," Bodwitch (2017, p. 90) notes, "New Zealand's inshore fisheries and fishing communities were predominately fished and populated by Māori." As Memon and Cullen (1994, p. 160) recount, the then Ministry of Fisheries were warned that their decision to exclude part time fishers from receiving quota would have "devastating impacts" in a report commissioned to examine the potential impacts. This report was ignored, and huge swathes of Māori fishers lost their licenses as a result. As Song et al. (2018, p. 289) explain, many of these fishers were based in fisheries they believed they already owned – "hence, [they had] no need or desire to follow reporting procedures of government." Most Māori fishers also had "diversified livelihood strategies, as fishers supported meager fishing incomes with additional employment elsewhere", meaning few met the 80% of income criteria required to receive quota (Bodwitch, 2017, p. 90). A third reason Māori fishers received less quota at the implementation of the QMS is that the "vertically integrated processing companies with knowledge of ITQ system implementation, and access to extra boats and gear, put additional boats on the water to increase their reporting" (Bodwitch, 2017, p. 90). Consequently, as McCormack (2018, p. 274) concludes, "[t]here is an absence of Māori fishermen at all levels in the commercial industry."

After the 1992 Act "the transfer of quota shares to settle Māori fishery grievances concentrated control of fish sales and trade in the hands of non-Māori processors" (Bodwitch, 2017, p. 90). The Trust created to hold Māori quota did not operate any boats, so it leased this quota out to processers with surplus capital. The Trust's "management of Māori-owned quota as an investment asset furthered processor control through accumulation by dispossession: processors

with quota obtained capital to fund additional quota purchases by paying hired fishers a low percentage of the total sale of the fish" (Bodwitch, 2017, p. 90).

Bodwitch (2017, p. 91) explains how both ACE and LFR "also limit the extent to which iwi quota re-allocation initiatives can promote small-scale fishers' economic development." Regarding ACE, Bodwitch (2017, p. 91) explains:

> The ACE legislation increased processor control because ACE does not count against quota consolidation limits... the opportunity for larger operations to raise capital by decreasing competition excludes small-scale fishers and new fishers... [and the] ACE regulations additionally furthered processor control and small-scale fisher exclusion by making it possible for quota owners to register quota as a security for raising capital.

Similarly, the LFR legislation has restricted Māori involvement in fishing. Bodwitch (2017, p. 91) outlines how "[p]rocessor certification requirements that increase the amount of capital individuals must obtain to access fish markets are especially challenging for Māori to meet. Effects of colonial-era policies continue to restrict access to capital for Māori."

Since the QMS was implemented, Māori fishers have been excluded from actively participating in fishing, with the regulations that have been added since the QMS was introduced, particularly ACE and LFR, increasing this exclusion. This is an issue across the wider seafood sector, as Winder (2018, p. 84) explains, "the long-term, ITQ-induced problem… of ease of transfer of quota and jobs out of communities and out of countries has certainly become manifest in New Zealand." As he (Winder, 2018, p. 78) explains, "Companies use foreign vessels and processing facilities which have reduced costs but compromised regional economic goals."

Aquaculture

The aquaculture sector is more consolidated than most others across the wider seafood industry. MfE (2007, p. 68) provides a history of the consolidation process in the sector:

The New Zealand aquaculture industry began in the mid-1960s with marine farming of oysters and then mussels, typically by small, innovative operations. It quickly established a domestic market and began making inroads into export markets in the 1970s. As aquaculture techniques and value chains became more sophisticated in the 1980s, small owner-operator farms became less common and aquaculture/seafood-related companies expanded and consolidated. Production efficiency, control of stock and cost reduction dominated industry thinking as export markets expanded. During the 1990s global competition in seafood products intensified, driving further consolidation of the industry in an attempt to achieve increased production and marketing efficiencies.

MBIE (2017, p. 6) have also identified the consolidation occurring in the industry, "Aquaculture is more consolidated than wild capture; the top five companies account for approximately three quarters of the industry." Likewise, Stenton-Dozey et al. (2020, p. 4) explain that "In recent years the mussel industry has become highly consolidated, particularly with regard to processing and marketing. While many independent farms still exist, these generally grow mussels under contract to the larger processing companies." MfE (2007, p. 71) go into detail about the consolidation process:

> The majority of aquaculture activity is undertaken by corporate concerns, including wild fishery companies that have diversified into aquaculture. A range of farm operating models are used, including operating their own farms, share farming arrangements, and providing farm management for absentee farm owners. Corporate participants have expanded production by buying out or partnering smaller farmers. Here, seamless transfer of farm ownership has been preferred to deliver value from stock transferred with sale and/or to best maintain equipment in the water. Buyouts have historically occurred as companies have sought to diversify operations over a range of sites as a risk management measure… Corporate operations favour vertical integration, and achieve efficiencies from large processing sites. The number of owner-operators continues to dwindle as operating efficiency throughout the value chain becomes increasingly important to viability, particularly in mussel and oyster production.

Economic changes

The QMS has also transformed the marine economy beyond the industry consolidation it has brought about. It has both created a universal nationwide economy where localised and variable economies previously existed and it has generated a division between the actual production processes and the market of quota trading and leasing.

Firstly, the QMS brought about the homogenisation of what were diverse local fishing economies. As McCormack (2018, p. 278) explains, the QMS saw "the marketisation of fisheries and the imposition of national regulations that were unable to comprehend variations in local ecosystems." Where previously each local community had their own economic relations and patterns, the QMS forced a single monolithic economic and regulatory framework across the entire country.

It has also created separate economic realities for those actually fishing and those who own quota. Originally, it was believed that quota would be traded frequently, ensuring supply and demand. However, as Hersoug (2018, p. 103) notes:

> [T]he quota market turned out to be fickle. Owners with a long-term perspective were interested in *owning* quotas, not trading them. That particular problem was solved by attaching annual catching entitlements (ACE) to the quotas. The ACE could be traded freely, and for the time being solved the lack of flexibility problem. Over time, this resulted in a number of quota leases, i.e. operators who leased ACE from owning companies, most often with delivery obligations in return.

Likewise, as Torkington (2016, p. 181) explains:

> The introduction of ACE was to provide liquidity in the market that encouraged catch balancing to occur in a more transparent and effective manner. By and large this has eventuated; some stocks have ACE traded multiple times in a year before finally being committed to balancing a particular catch. However, for many stocks there is a clear lack of liquidity and fishers are faced with an immediate decision when unexpected or unwanted catch is hauled onto the deck; land the catch and pay the deemed value or discard at sea.

The introduction of ACE created an even greater division between production and quota trading. "The QMS is based on market logic," Torkington (2016, p. 180) explains, "and with it the government created a market (albeit not a free market) to govern access to fishery resources." This market is separate from the actual process of catching and selling fish. Torkington (2016, p. 182) continues:

> [I]nterpreting the ITQ share market within the QMS as a 'competitive' market that will drive efficiency has perverse effects. It serves the incumbent quota shareholders well by generating them anti-competitive returns in the form of economic rents. The ITQ market can only act as a competitive instrument to drive efficiency if there is no economic rent. The sole purpose of the resource rental regime abandoned in 1990 was to capture economic rent and maintain competition throughout the quota market: without this mechanism economic rents have boomed and profits slumped… the markets embedded within the QMS do not drive competition, innovation, value creation, efficiency, or social benefits. Instead, they act in concert to

> secure a monopoly, with terms of trade set by government.

Thus, there are an increasingly small number of quota owners growing income on the quota market, while the process of actually fishing is further divorced from this revenue stream. As McCormack (2018, p. 283) explains:

> In ITQ fisheries, a distinction can be made between quota holders, those who have the right to fish and/or to lease this right to others, and fishers who do the actual harvesting… This is true not only in activities in the quota trading market (buying and selling quota), but is also reflected in the rewards that accrue to owners who lease their quota as distinct from fishing it.

McCormack (2018, p. 284) then provides an example of how this manifests in leasing pāua quota:

> Figures for the 2014–15 year put the dollar per kilo price of quota at NZ$338. The average ACE value is NZ$15.50 per kilo whereas the port price is NZ$16.50 per kilo; thus, after paying for the leasing arrangement, non–quota-owning harvesters receive NZ$1 per kilo of pāua sold. The ratio of the value of quota to the price of fish is approximately 23:1 and the owner obtains 15-and-a-half times as much from leasing quota for one year (NZ$15.50) than the fisher gets from harvesting (NZ$1).

The economy created by the QMS is imbalanced, it has created two separate 'economies' that have little to do with each other, with the most profitable being the market where quota is traded rather than the returns gained through actually fishing. This constrains the development of local Māori communities. This loss of community involvement is the direct outcome of the QMS. As Pinkteron (2015, as cited in Winder, 2018, p. 84) noted in her critique of these systems, "the long-term, ITQ-induced problem… of ease of transfer of quota and jobs out of communities and out of countries has certainly become manifest in New Zealand".

Employment issues

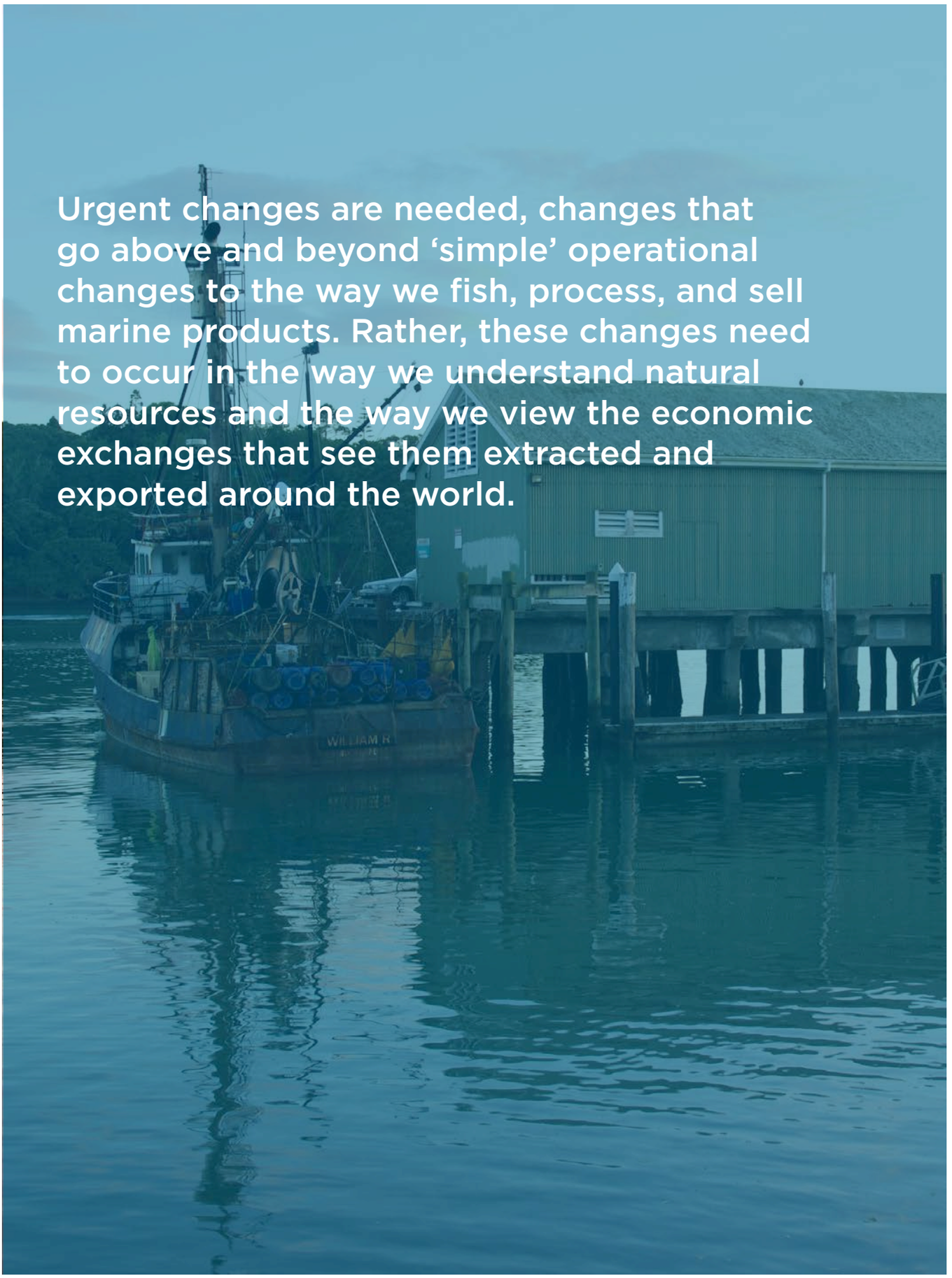
Several related constraints to localised development are the lack of potential Māori employees with the necessary skills and experience and the general trend in the sector towards both lower employee numbers and lower paid foreign employees.

Regarding the limited pool of potential Māori employees. Speaking at a more general level, Norman (2012, p. 11) explains that:

> Fewer young people are interested in a career that in some cases has been the family business for generations. This means as fishers get older in what is a physically demanding job, it will be more difficult to replace them. Second, processors in some parts of the country find it hard to find factory-floor workers.

In terms of Māori employees, Memon and Kirk (2011, p. 113) note that:

> [I]t is often difficult in a competitive commercial environment to remain committed to the concept of employing solely from iwi. The case of Raukura Moana Fisheries Ltd (a company that no longer exists) illustrates this point, as the iwi had to employ outside consultants during its formation period because of a lack of institutional knowledge on running fisheries companies.


Urgent changes are needed, changes that go above and beyond ‘simple’ operational changes to the way we fish, process, and sell marine products. Rather, these changes need to occur in the way we understand natural resources and the way we view the economic exchanges that see them extracted and exported around the world.

While speaking of the sector as a whole, Norman (2016, p. 11) also identifies another issue for localised development when he refers to one significant "obstacle [being] finding management, engineering and administrative staff for processors in smaller towns."

Due to a range of factors, including automation and other efficiencies, sector employment was down 26% between 2001-2015, with only "modest gains in production per worker" (Norman, 2016, p. 2). Aquaculture employment has been stagnant since 2000, with 600–700 full-time equivalents (FTEs), while fishing employment fell from 2000 to 1800 FTEs. 2100 FTEs were cut from seafood processing through plant closures, while "many businesses are consolidating and automating processing operations" (Norman, 2016, p. 11).

In terms of foreign employees, one Māori fisher explains how:

> It's frustrating to see that while we are training people and raising their capacity on the one hand, the employment outcomes that they could have legitimately looked forward to through a company they have a major stake in (Sealord) will not be there because it's being taken by Russian crews (Memon and Kirk (2011, p. 113).

Biological constraints

Ideally, the opportunities for community fisheries development would align with the locations of those communities. However, there are biological constraints – and some overlying legislative ones – that mean some areas are more advantaged than others.

While the Aotearoa New Zealand government oversees an enormous EEZ of four million square kilometres, this asset does not have high average biological productivity compared to other regions because of sea temperature and nutrient supply (Winder, 2018). Furthermore, as Winder (2018, p. 79) outlines, "Commercially useful species are widely dispersed and collocated, and many of the few hot spots of biological activity are located in coastal areas where they are subject to competing stakeholder interests." Many of the best fisheries are in remote and unpopulated places, with roughly 60% of the commercial fish harvest coming from the Chatham Rise and Sub Antarctic areas and another 30% caught off the country's rough and wild west coast (Winder, 2018, p. 79). The deepwater fisheries are able to be accessed from ports in Cook Strait or the South Island's Pacific Coast, particularly Nelson, Christchurch and Timaru (Winder, 2018), while the North Island has the far higher Māori population. The west coasts of both North and South islands have few ports and those few have dangerous port entry and exit conditions. Of all the ports in Aotearoa New Zealand, Nelson is the best placed in terms of proximity to the best fisheries and safe entry and exit conditions. Before the implementation of the QMS and the industry consolidation that occurred, fishing was far more widely dispersed across the country. Since the 1980s, as (Winder, 1998, p. 84) explains:

> There has been a substantial restructuring of the workforce, with a spatial localization of employment in a few regions, principally Nelson, Tasman and Christchurch, and

> declines elsewhere, with a long-term decline in the number of workers employed in fishing and with growth in part-time processing work. So export success is accompanied by casualization of the workforce.

The Nelson/Marlborough region holds around half of Aotearoa New Zealand ACE (Pavlovich and Akoorie, 2010). Nelson is one of the largest fishing ports in Australasia, with over 100 fishing vessels and 26,000 FTE equivalent positions across the entire sector and associated industries (Pavlovich and Akoorie, 2010). While Nelson fishing has boomed under the QMS, this has seen other areas decline.

Another biological constraint is declining state of some stock levels:

> The diminishing state and reduced accessibility to a handful of important inshore species including abalone, cockles, mussels, oysters, surf clams and a few finfish were especially worrisome for informants. Of concern to many interviewees is the restricted access, particularly for elders and those without expensive equipment, to important inshore species as a consequence of overexploitation (McCarthy et al., 2014, p. 374).

Related to this declining stock is the boom-bust cycles of fisheries. As McClintock et al. (2000, p. 5) note in their study of three New Zealand fishing communities, the "major theme emerging from these case studies is the impacts of the boom-bust cycle in the fisheries on the communities." "Both Riverton and Moeraki were in the bust phase at the time of our field research," they (McClintock et al., 2000, p. 5) continue, "while Havelock was experiencing the effects of growth from marine farming." Regarding Riverton and Moeraki, they (McClintock et al., 2000, p. 5) explain:

> The main species of fish harvested by vessels off the southern coast of the South Island are blue cod, rock lobster (crayfish) and paua; with the latter two species being the most economically significant. The industry's contribution to the regional economy has varied with the fluctuations in the fish stocks around the coasts. Booms in particular fisheries (e.g. rock lobster) have attracted newcomers to the region and generated strong economic growth in some localities, while the depletion and restrictions on the harvesting of particular species (e.g. oysters) has put financial pressure on i ndividual operators.

Havelock, on the other hand, has moved in the other direction: "Over the last three decades of the 20th century Havelock has experienced the transition from wet fish to marine farming; with the number of registered fishing vessels at the port declining from 78 in 1976 to 13 in 1997" (McClintock et al., 2000, p. 5).

While aquaculture has fewer biological constraints than wild fisheries, generally speaking, there are some constraints. For example, as MfE (2007, p. 70) notes, "There are also regions that are unlikely to support aquaculture in the near future due to their characteristic coastal marine conditions (e.g. the North Island's west coast)." However, while this may be true of some aquaculture species, there are options for alternatives. For example, there are efforts to establish a whitebait aquaculture industry on the west coast of the South Island, an area as inhospitable if not more so than the North Island's west coast.

For centuries, oceans have been viewed by the West as a near infinite resource to be exploited for human benefit. “Colonization of the islands across Oceania” McGinnis (2012, p. 18) explains, “was supported by a myth of an ocean as an expanding frontier with endless resources.”

3.2 Potential solutions

Quota

One possible solution to providing balance is for MIO to provide quota for local communities. As Tau (N.D., as cited in in Matthews, 2018, p. 27-28) explains:

> "Dominance in property rights brings tino rangatiratanga which then allows Māori to be Kaitiaki. To solve the problem long term, we need to buy quota which will give jurisdiction over mahinga kai and land and enhance the iwi or hapū to stop the council from doing things. You can only truly be Kaitiaki when you own the whole lot of the land, quota or waterway."

Collaborative structures

Collaborative structures are also able to help with a key strategy for auahatanga, creating value chains. As TOKM (2018, p. 4) explains "economic returns can only be improved by active participation in the value chains using quota." However, as they continue, "Individual iwi do not have the scale for such successful participation. A co-operative pan-iwi approach to this investment is essential" (TOKM, 2018, p. 4). As well as internal Māori collaborative structures, marae and rūnanga could also seek to bolster and enhance their influence through alliances with other groupings such as environmental groups. As McCormack (2011, p. 286) explains:

> Eco-indigeneity may add legitimacy to Indigenous claims and prove valuable as a mobilizing tool, a strategic device noted by the chief negotiator of Te Whanau a Apanui, Rikirangi Gage. The negotiations between Te Whanau a Apanui and the Crown have generated a Heads of Agreement. This document refers to eight instruments 'through which the mana [authority/influence] of the hapu of Te Whanau a Apanui, in relation to the public foreshore and seabed in their rohe [tribal territory], would be recognised at law in a way that is consistent with the object of the Foreshore and Seabed Act'.

She (McCormack, 2011, p. 286) does go on to note that "the partnership between Indigenous groups and the environmental movement has inherent tensions. At its most extreme, eco-indigeneity is an essentialized interpretation of indigeneity based on the supposed inherency of Indigenous environmental knowledge and primordial attachment to place."

Likewise, as TOKM (2018, p. 4) explain:

> Commercial co-operation requires new relationships between iwi and new business structures that strike the culturally appropriate balance between individual iwi quota ownership and collective iwi value chain investments to carry Māori products with an authentic Māori story to the wider world. Considerable effort has already gone into the development of these arrangements. Perhaps the most notable success to date has been the Port Nicholson Fisheries structure involving 28 iwi and Aotearoa Fisheries Ltd. This model can be readily adapted for other sectors such as pāua and inshore finfish species.

"Transferring voting shares and the balance of the income shares in AFL held by TOKMTL to Iwi will remove the TOKMTL layer and its costs" (Castle, 2015, p. 15).

Cluster development

Connecting auahatanga with whakatautika, the same Treaty claim negotiator and respected iwi member Memon and Kirk (2011,

p. 112) quoted previously explained how with cluster development:

> There is no reason why the iwi should not have a finance company which is capitalising on young people moving into this sector, on the condition they fish back to the tribe [share profits with tribe]. The owner-operator, the community and the finance company can work together towards [creating] a fish processing unit at the wharf. [There is] no reason why the finance company can't handle the exporting, and foreign exchanges for selling the fish.

As Memon and Kirk (2011, p. 112) themselves note, "Seafood companies, embedded at a global level, can produce finance that can subsequently be reinvested into the community through 'cluster development' initiatives."

Decentralised development

In reference to Ngāi Tahu, Barr and Reid (2014, p. 221) argue that "it is necessary to incorporate aspects of both approaches – centralization and decentralization – to meet the economic development aspirations of the original resource owners", proposing new tribal business models that were grounded, developed, and refined in a participatory manner with whānau, rūnanga, and communities. Their project was focused on how to decentralise pounamu, with many of the insights from this project being applicable to the marine sector. Ultimately, the pounamu project saw the resource still held at the iwi level with each papatipu rūnanga responsible for their own commercial and cultural development policies. The iwi provided an array of support from financial to operational, as well as creating an authentication scheme and an online sales portal, with several layers of reciprocating fiscal interactions to sustain the overall project (Barr and Reid, 2014, p. 226). As they explain:

> [This helped] achieve this balance through encouraging a degree of decentralization to promote the economic development of the Rūnanga and whānau, whilst still retaining a level of coordination and management at the tribal centre. The centre provides a mechanism for enabling rūnanga and whānau business development based on cultural authenticity, traditional and contemporary resources and skills, and through the use of an Internet-based virtual infrastructure that provides an efficient means to equitably deliver support and resources to Rūnanga and whānau.

Ngāi Tahu has been successful in implementing some iwi-internal collaborative structures. Bodwitch (2017, p. 91) describes three strategies for quota management that aim to facilitate fishers' economic development without diminishing the overall quota value:

> (1) the sharecropper strategy, in which the iwi sells ACE to non-iwi processors who allocate it to Ngāi Tahu fishers; (2) the development pool strategy, in which the iwi sells ACE through an iwi-owned processing plant, at a subsidized rate, to Ngāi Tahu fishers; and (3) the fisher-owned Annual Catch Entitlement (ACE) strategy, in which the iwi sells ACE directly to iwi fishers.

As she (Bodwitch, 2017, p. 91) concludes, "Each strategy gets progressively closer to devolving more benefits to tribal fishers, but none do this in a completely successful way." However, even at the most devolved

level, where the iwi is subsidizing the fisher, "due to Licensed Fish Receiver certification requirements that increase the amount of capital an individual must obtain to become a processor… [the] fishers' abilities to profit from fish sales remain limited by consolidation of the processing sector" (Bodwitch, 2017, p. 93).

Cultural, social, and human capital development

Alongside financial capital, cultural, social, and human capital need to be developed in local regions, so that the opportunities can be actioned in a beneficial manner. Broadly speaking, these forms of capital relate to fluency with cultural knowledge and values, well developed and vibrant social networks and relationships built on trust and reciprocity, and the depth and breadth of an individual's skills, experiences, and capacity, respectively. There is a degree of crossover between these three and it should be noted that from a Māori perspective they can be seen as nested perspectives of the same thing. That is, human capital is a manifestation of social capital, both of which emerge from and are informed by cultural capital. As Best and Love (2010, p. 5) explain "cultural capital may give rise, at least partly, to social capital."

Human capital, as the most easily identified and isolated, has been the subject of much study. Human capital, as Whitehead and Annesley (2005, p. 11) explain includes "innate abilities, learned skills, accumulated formal knowledge (as measured through qualifications) and tacit knowledge. Of these, qualifications and years of education are the easiest to measure and are often used as proxy measures of human capital." As Benhabib and Spiegel (1994, p. 144) note, "human capital accumulation has long been stressed as a prerequisite for economic growth." Even though the empirical data is too complex and multifarious to provide clear proof of the causational connection, there remains a widespread "belief in the central role of human capital formation in economic development" (Gundlach, 1997, p. 1). Social capital is even more complex, though as Onyx and Leonard (2010, p. 383) note, there "is increasing evidence that social capital has a significant positive effect on economic development within a particular region." Further, they (Onyx and Leonard, 2010, p. 383) note that there is a "relationship between trust [a key social capital metric] and economic growth in a larger cross-national sample, one that was at least as strong as that between human capital and growth." "Cultural capital", Best and Love (2010, p. 2) explain, "holds much prospect as a theoretical concept for engaging core Indigenous Māori values in capitalistic endeavours." They conclude that one of "the reasons for [Māori businesses'] success have been their ability to convert traditional principles and philosophies into economic gains; that is, turning cultural capital into economic capital over and above what can be expected." Likewise, Kawharu (2001, p. 3) explains that "[c]ultural foundations – moral and material – provide security, capacity and incentive for maximising resources generally."

All three forms of capital are well understood as being key drivers to community development. As Kay (2006, p. 167) explains:

> [R]ecognizing the existence of social capital, our understanding of the way communities operate and how they function is enhanced and directs community development strategies towards interventions that will help (re)build social capital... [However] Social capital alone cannot build the social economy and develop communities. It has to be used in conjunction with the other forms of capital – financial, human, environmental and cultural. Adding to social capital and within a local area is not a substitute for other forms of capital and will not of itself grow the social economy.

There are too many ways in which these forms of capital can be built up to list. Rather a summary of several ways that directly relate to other constraints and solutions outlined here will be examined. The first of these is the possibility of training and upskilling local Māori communities so they have the ability to actively participate in any economic opportunities. Memon and Kirk (2011, p. 112) note that:

> Ngahiwi Tomoana, chairman of the Ngati Kahungunu Iwi Incorporated, sees training as the key element involved in returning the benefits of fisheries assets to the community: It's coming down to training now. Training our people in all sectors from processing, to management, to marketing, the sales team, governance, the whole lot. We're trying to fill all the sectors of the industry'.

NSCC was initially focused on developing connections between the seafood industry and education facilities that trained potential staff (Memon and Kirk, 2011).

Leadership and cultural-matching

Community development needs to be both well led and culturally-matched, such that the structures and strategies are all seen as appropriate by the community and an individual with mana can usher the project into being. Both these concepts emerged out of the work of Cornell and Kalt (as cited in Hunter, 2012, p. 151), who after decades of examining economic development across Native American reservations determined that there were four key driving factors that determined success or failure:

- **Sovereignty Matters.** When Native nations make their own decisions about what development approaches to take, they consistently out-perform external decision makers on matters as diverse as governmental form, natural resource management, economic development, health care, and social service provision
- **Institutions Matter.** For development to take hold, assertions of sovereignty must be backed by capable institutions of governance. Nations do this as they adopt stable decision rules, establish fair and independent mechanisms for dispute resolution, and separate politics from day-to-day business and program management
- **Culture Matters.** Successful economies stand on the shoulders of legitimate, culturally grounded institutions of self-government. Indigenous societies are diverse; each nation must equip itself with a governing structure, economic system, policies, and procedures that fit its own

contemporary culture

- **Leadership Matters.** Nation building requires leaders who introduce new knowledge and experiences, challenge assumptions, and propose change. Such leaders, whether elected, community, or spiritual, convince people that things can be different and inspire them to take action

Tau and Rout (2018, p. 106) have argued that "Indigenous economic development is more likely to succeed if it is conducted within culturally-matched institutions." Similarly, as O'Sullivan and Dana (2008, p. 372) explain:

> Putting in place an appropriate structure is crucial to the success of Maori economic development and a prerequisite for the creation of such a structure is that a community must have a political institution that is recognised as possessing legitimate authority. This political institution either takes on the responsibilities of the economic development programme or is the governance body for the structure that is delegated the task. A structure that takes on these responsibilities needs to possess a cultural match with the community it is working with and should have been formed at the appropriate level of Maori society.

While they do not use the phrase cultural matching, O'Sullivan and Dana (2008) refer to the same connection between culture and legitimacy. "Community support", O'Sullivan and Dana (2008, p. 372) outline, "is generated by a structure having a mandate from the community's political institution and the structure organising and exercising authority in a way that is understood and accepted by the community." They (O'Sullivan and Dana, 2008, p. 372) note that a legitimate structure: "knows its stakeholders; recognises the individual rights of community members; facilitates community participation in its decision-making process; and is accountable to the community." In terms of strategies, O'Sullivan and Dana (2008, p. 373) outline, "social issues such as the development of community housing and improvement of community health as well as cultural preservation and advancement should all be considered as key measures for Maori economic development plans." "A structure, that decides to exercise its community mandate and make the decision regarding priorities for development, should be influenced by the community's existing resources, choosing outcomes that have the best match with these resources". (O'Sullivan and Dana, 2008, p. 374)

Ensuring the right leadership is in place and fostering that leadership is critical, leaders need support. Horn and Tahi (2009, p. 85) explain the importance of good leadership, as well as the importance of wrap around support for those leaders:

> Culture is an important element in these patterns. Tribal connections to land, a strong sense of cultural identity, and a strong desire to work to better the fortunes of the local community draw some Māori back to rural areas to "keep the home fires burning" (as they describe it). Such a move often costs these individuals considerably in terms of their earning capacity. Furthermore, once back, their tribal leadership skills are in high demand and working to fulfil this need can take an enormous amount of time from those with the capacity to work on developing new businesses.

Diversification

The boom and bust nature of fisheries—even when balanced out by the QMS—means that no community development scheme should focus on a diversified marine economy. In their study of three coastal villages that had traditionally focused on fishing, McClintock et al. (2000, p. 8) noted that a:

> [T]heme emanating from the case studies reveals that the fishing communities are becoming more reliant on alternative uses of the marine environment or land-based economic activities to reduce their dependence on fisheries that are subject to cycles of boom and bust restricted access, and greater government regulation.

As they continue, McClintock et al. (2000, p. 8) explain:

> Although Riverton, Moeraki and Havelock, are communities that have depended mainly on commercial fishing or marine farming as their economic base, they have also relied on other natural resource sectors of the district and regional economies (e.g. farming, forestry) to contribute to the welfare of their residents. As fish stocks have become depleted, and access to those stocks has become more restricted, there has been more urgency in these communities to switch to less traditional forms of economic activity (e.g. tourism) to offset the declining returns from the marine environment.

They (McClintock et al., 2000, p. 8) also note:

> Local community leaders and the Southland District Council have tried to enhance Riverton's image as a tourism destination for both domestic and foreign visitors through a series of projects that were initiated by a concept plan developed seven years ago. The projects have focused on events that will attract visitors and improve the district's amenities. A recent innovation by operators of fishing vessels at Moeraki has been the development of two chartering operations to cater for the needs of recreational fishers. A family partnership pioneered one of these ventures at the port three years ago.

Aquaculture

Aquaculture could provide an important development pathway for Māori communities for a number of reasons. Firstly, it overcomes the biological constraints of wildfish hard limits, even if it does come with its own set of biological constraints. Secondly, it delivers kaitiakitanga as it is more sustainable than wild catch. Thirdly, aquaculture is a largely rural enterprise, providing a balance to the big corporate operations. As Crimp (2007, para. 16) writes, "Aquacultural enterprises benefit rural New Zealand, bringing investment to coastal regions and creating jobs in areas that have suffered from centralisation." This is backed up by Stenton-Dozey et al. (2021, p. 2), who explain that "Although a relatively small industry in New Zealand, aquaculture is important economically as it provides rural employment and business opportunities." Crimp provides several examples of local economies that have been transformed by aquaculture:

> The small rural town of Havelock, at the head of Mahau Sound, is one community that has been transformed by mussel farming. According to Graeme Barsanti, local policeman and Marlborough district councillor for the past 15 years, two-thirds of the town's population work in the mussel industry. Others are employed in tourism and the food and beverage industry, both of which have

> flourished on the back of mussel farming since the early 1990s… The small Northland town of Kaeo is another example of how aquaculture has given new life to a community. Before seafood company Sanford converted an old dairy factory into an oyster-processing plant in 1999, the town was developing an air of neglect; unemployment was high and government benefits provided a major source of local income. The plant employs over 100 staff on a seasonal basis and is the town's main employer.

According to Crimp (2007, para. 16), every job directly created by aquaculture "generates 7–10 jobs in processing and 0.4 jobs in the wider community. New Zealand aquaculture now employs nearly 30 per cent of the total seafood-industry workforce." Te Puni Kōkiri (2009, p. 2) recommends this as a strategy for Māori:

> Māori are advised to develop strong relationships with industry and science providers in order to gain an understanding of which species may be best suited to them in order to achieve their aspirations for iwi, hapu and whānau.

Māori have an obvious advantage when it comes to aquaculture as "the Māori Commercial Aquaculture Claims Settlement Act 2004 provided for, 20% of historic and new marine farm space to be allocated to local Māori tribes" (Stenton-Dozey et al., 2021, p. 3). A spokesperson for iwi in the far north notes that aquaculture has the potential to bring significant benefits to iwi and it seems a logical progression that Māori be involved given their historical connection with the sea:

> Our relationship with the sea is a spiritual matter. It has focused on the sea as a source of food—kai moana for survival. We are very concerned about the sustainability of natural fish stocks because we mustn't deprive our grandchildren of the opportunity to gather seafood. That's what it's all about (Crimp, 2007, para. 47).

In the MPI Aquaculture Strategy, one of the four key outcomes is inclusiveness. As the strategy outlines:

> Working in partnership with Māori, iwi and communities to consider a range of interests together results in more accepted, trusted and enduring outcomes. The Crown has an aquaculture settlement with Māori under the Māori Commercial Aquaculture Claims Settlement Act but this is just one part of the Crown Treaty partnership. We will consider historical Treaty of Waitangi settlements, and Māori aspirations and values including kaitiakitanga across all our work (MPI, 2019, p. 16).

Tourism

Marine tourism offers a solution to whakatautika, particularly as it overcomes the biological constraints – though it also comes with other constraints. The post-COVID-19 landscape needs to be assessed, however, as it has had a long-lasting impact on the tourism sector. That said, tourism still provides a path for community development. As Horn and Tahi (2009, p. 85) explain admittedly in pre-COVID times, "Rural Māori need ways to support their activities in their home areas economically. A handful of small Māori ecotourism businesses have started up in New Zealand in response to this need and are considered highly successful."

For marine tourism, a Māori community needs some form of marine attraction. This can run the gamut from some form of activity – like fishing, surfing, or kayaking – through to a natural attraction – like marine mammals or a natural formation. These are geographically restricted, as not all areas will have an attraction that will bring in tourists. Further, there are possible warnings. As Spiller and Erakovic (2005, p. 233) note, after the success of Whale Watch Kaikoura, virtually every hapū across the South Island "started furiously hunting for things to 'watch'." There were a number of attempts to create seal, dolphin, albatross, and even muttonbird watching businesses, but while some were launched, none lasted. The lesson being that simply locating an 'attraction' is not enough.

The utility of Māori culture as a draw card is also contestable. As Horn and Tahi (2009, p. 91) note, "Work in the wider research programme indicates that Māori culture is not currently a strong selling point for tourists surveyed in both case-study areas, although it does add value to a tourism product." They (Horn & Tahi, 2009, p. 91) further contextualise this by noting that:

> In the 1990s for example, staff at Whale Watch Kaikoura, one of New Zealand's best-known Māori ecocultural tourism businesses, reported that they preferred not to tell their stories about the place and the whales because of the lack of interest shown by customers.

While there has been a growth in interest in the culture, it seems that the business needs to be robust without culture. Culture, can play a more significant role in the vision and operations of the business, but possibly not the front-facing component of the business.

One possible means by which Māori marine tourism ventures can be launched, is using the cluster development strategy outlined in auahatanga. As Thompson and Ruwhiu (2013, p. 854) refer to the "the utility of business networks/clusters, both formal and informal, in the Māori business field, which we highlight as a vital component driving Māori economic development." They examine the role "networks and clusters have in terms of supporting the growth aspirations of Māori tourism enterprise", concluding they "operated to fulfil a range of social, cultural and business opportunities, Te Kupeka Umaka Māori ki Araiteuru (KUMA), a Māori business network in Dunedin, specifically provided support for and celebrate the 'Māoriness' of members in a way that enhanced the experience for the business, its stakeholders and customers. (Thompson & Ruwhiu, 2013, p. 854).

Whale Watch Kaikoura (WWK) started in 1987, when the Kaikoura economy was in crisis, with 3,400 visitors a year through its Visitor Information Centre and the Māori unemployment rate at an estimated at 90% (Spiller & Erakovic, 2005). By 1995 the number of visitors through the Visitor Information Centre was 191,443 (Spiller and Erakovic, 2005). In its first year the company took 3,000 passengers in one inflatable boat, it now takes around 100,000 – with 95% success rate – and operates four purpose built catamarans from its own marine in Kaikoura. While employment continued to decline in agriculture, railways, and communications in the region during the

nineties, the service and hospitality sectors saw an increase in employment of 25% (Spiller & Erakovic, 2005). By some estimates, WWK accounts for one-third of Kaikoura's full time jobs, either directly through the company, or indirectly via the multiplier effect of WWK employees spending their wages in town and of the services and hospitality that the WWK passengers spend money on while in the region (Spiller & Erakovic, 2005). WWK was originally a hapū venture and the original founders were unable to secure a loan for WWK until they offered their homes as security. Ngāi Tahu Holdings Corporation invested in the company several years after it was founded and in 2002 owned a 43% stake in the business.

WWK in conjunction with the Kaikoura District Council (KDC), has delivered organisational improvement, with a focus on sustainable development within cultural parameters. In 2004, Kaikoura became the first local authority, and only the second community, in the world to gain Green Globe certification – WWK and the KDC worked together to develop indicators that secured the certification and WWK have been operating in a way ever since that has seen the certification retained (Spiller & Erakovic, 2005). WWK have also sought to manage the growth of their business to ensure that the wider Kaikoura township does not experience negative social outcomes and a balance had been struck between the commercial scale of its operations, environmental considerations, community interests, and demand from tourism (Spiller & Erakovic, 2005). They have also invested in the community, using sponsorship and social development programmes to increase social outcomes. WWK also has a strong focus on environmental outcomes. They monitor and patrol the coastline looking for any indication of wider environmental issues or dangers to whales. They also take a personalised approach to the whales themselves; their detailed records of each whale enable them to detect new whales and give them more space than those whales that are used to the boats (Spiller & Erakovic, 2005). As WWK explains:

> All Whale Watch vessels are specially designed for whale watching. Our modern catamarans are powered by inboard diesel engines and equipped with Hamilton propulsion units that minimise underwater noise. All on-board toilets are self contained and never allowed to pollute the sea. Detailed records are kept for each trip, covering personalised identification of every whale seen, its location and any unusual whale behaviour. This information is part of the on-going contribution to scientific research by Whale Watch. Some Sperm Whales that visit Kaikoura regularly appear to recognise and trust the Whale Watch boats and do not mind being approached. New whales, though, prefer the boats to keep further away. Whale Watch skippers recognise individual whales and adjust operations to suit each whale (N.D., as cited in Spiller & Bhowmick, 2014, p. 148)

The value of each whale was quantified by Orams (2002), estimating that one humpback whale, returning every year to breed in Tongan waters, would generate US$1 million in tourism revenue during its 50-year lifetime.

Alternative economic models

There are a range of alternative economic models that provide potential pathways to increasing whakatautika within 'blue economy' thinking. These new economic models are referred to by a range of different terms such as circular, regenerative or restorative (hereafter CRR economy unless in quotes), though the underlying ideas generally intersect. The European Commission (EC) notes that the blue economy "will make the economy more circular." Similarly, the United Nations Conference on Trade and Development (Kituyi & Bertarelli, 2020) talks about a "regenerative and equitable blue economy." Adopting a CRR economic approach may help Māori communities to avoid or overcome some of the constraints outlined above, particularly in terms of biological and economic constraints.

A CRR economy emphasises sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products rather than the 'make, use, dispose' linear pattern of the current economy. It turns "goods that are at the end of their service life into resources for others, closing loops in industrial ecosystems and minimizing waste" (Stahl, 2016, p. 235). "Circular economy initiatives", Lewis et al. (2020, p. 60) outline, "involve environmental sustainability-oriented activities that pay close attention to utilising or economising waste streams and low growth solutions in resource economies." The circular economy "replaces production with sufficiency: reuse what you can, recycle what cannot be reused, repair what is broken, remanufacture what cannot be repaired" (Stahl, 2016, p. 235). There is a '10-R' hierarchy of wastes in a circular economy: refuse, reduce, reuse, repair, refurbish, repurpose, redesign, remanufacture, recover, recycle (Dinica, 2021). "Circular-economy business models fall in two groups", Stahl (2016, p. 235) explains, "those that foster reuse and extend service life through repair, remanufacture, upgrades and retrofits; and those that turn old goods into as-new resources by recycling the materials."

Similarly, regenerative and restorative economies have five key principles:

1. **Minimalised resource pressures** – renewable resource use, low rates of extraction, replacing non non-renewable resources (especially in relation to energy)
2. **Low-consumption lifestyles and wasteless production** – e.g. co-operative ownership, sharing, recycling, renting of low-use items
3. **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
4. **Cooperation, co-learning and co-development** – as a platform for localised economies, knowledge transfer, and social and environmental justice

5 **The promotion of life and vitality over growth** – encouraging thriving economies rather than growth per se, with growth seen as a key target at certain times and in certain places rather than always and everywhere (Lewis et al., 2020, pp. 103–104)

According to Lewis et al. (2020, p. 60), the circular economy concept is "attracting attention among operators in New Zealand's marine economy." Likewise, they note that while regenerative and restorative economies "are in their infancy… interest is rising. In many ways, regenerative economies are the ultimate aim of [the] blue economy" (Lewis et al., 2020, p. 103).

Possible CCR economy innovations in the marine sector "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" (Lewis et al., 2020, p. 60). Dinica (2021, p. 201) notes that the new Aquaculture Strategy "requires commercial actors to 'Conduct lifecycle assessments for salmon, oyster and mussel farming and develop a waste and emissions transition plan' for a circular flow of natural resources; it also requires innovations in packaging to reduce plastic use."

Lewis et al. (2020, p. 60) provide several examples of businesses that have adopted CRR economy practices. One is Havelock Shell Processors, who "crush mussel shell waste to produce material of various grades for a range of purposes, including fertiliser, poultry grit and landscaping." Another successful example of the circular economy concept is Waikaitu, who are a small bio-stimulant and agricultural fertiliser company based in Nelson. They 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 (Lewis et al., 2020).

Another example is AgriSea, whose:

> [B]usiness 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 (Lewis et al., 2020, p. 62).

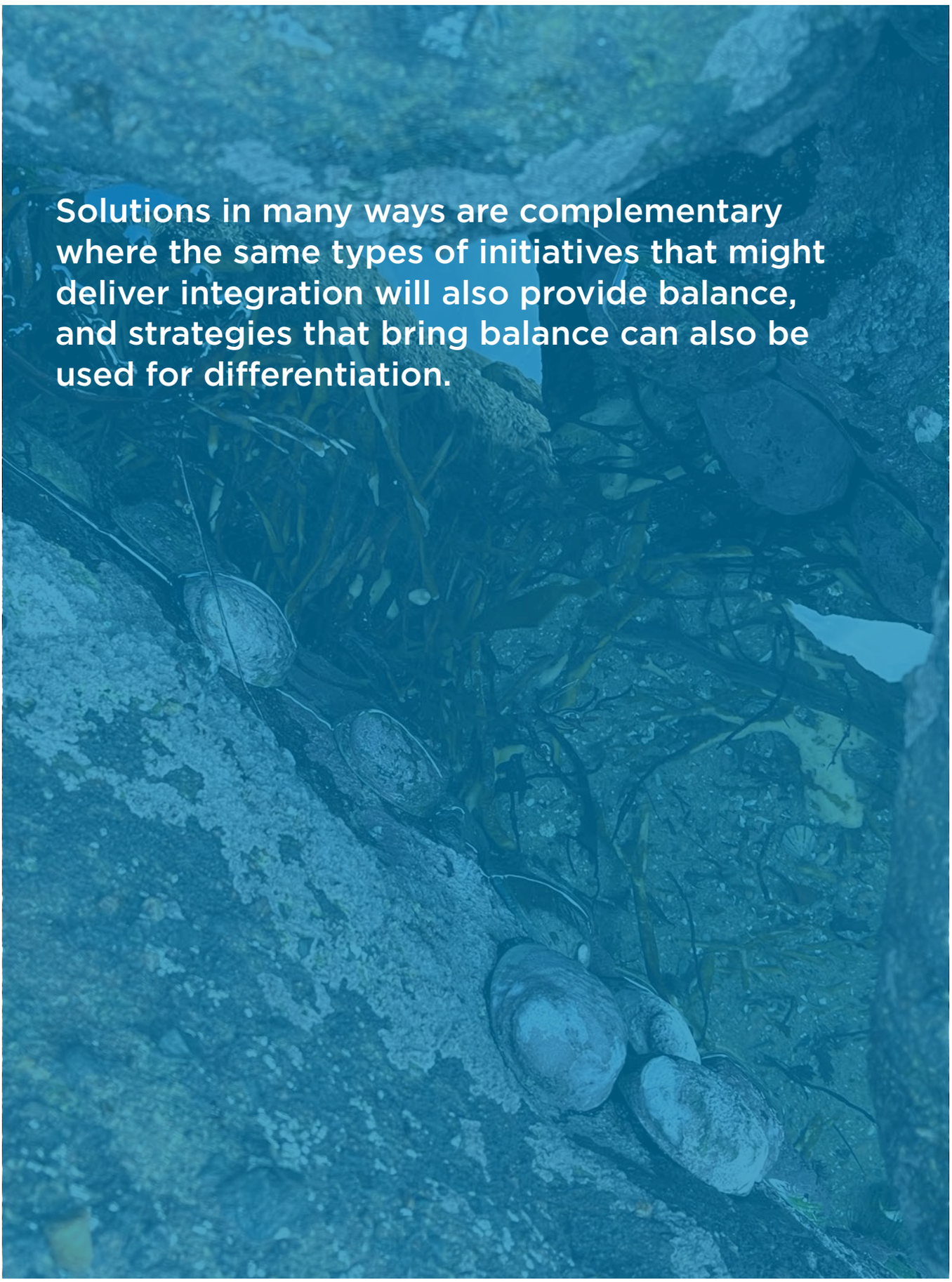
Conclusion

There are numerous issues identified across the three pillars—pāhekoheko (integration), auahatanga (differentiation), and whakatautika (balance)—in this report, along with a range of solutions. Obviously, the potential scope of this report is in some senses limitless, particularly in terms of possible solutions. In particular, there was scope to examine the global fishing industry as a whole, however, with some exceptions this was not done because of the sheer mass of work done in this area. Likewise, lessons from outside the sector could also have been gained by studying wider business and associated literature but again this would have opened the floodgates as there is even more literature than the fishing-related academic work. The aim has been to identify the most intractable or constraining problems and achievable solutions, with acknowledgement that this will always be a somewhat flawed and limited objective. However, it is in the next phases of the project where the actual problems and solutions sought by the case studies will be examined in detail. Here the aim was simply to map the terrain, rather than explore it.

Solutions in many ways are complementary where the same types of initiatives that might deliver integration will also provide balance, and strategies that bring balance can also be used for differentiation. Take, for example, cluster development, which offers potential solutions across all three pillars. This is a positive finding as, while each case study is likely to drill down into one of the three pillars, having cascading positive consequences from implementing a solution in one pillar effecting another, functioning as a 'force multiplier'.

That said, problems identified in some pillars, particularly those that have a legislated basis and are the product of many years of debate and compromise, mean solutions will require new thinking or adaptive outcomes. Of course, some of the original hinderances may have been overcome and some realities of the current settings may have become more apparent, creating less friction or opposition to change. However, changing institutional settings, laws and regulations in particular, is always a difficult process both because of the inherent weight of the status quo and because these are political processes often beyond control and prediction.

The next phase of the project is to identify which pillars the case studies wish to work on, to gather the primary data from them on these areas, and to begin developing potential strategies and solutions. This report provides a roadmap of sorts, but it should not be taken as the final word on the various areas covered, as the aim is to work with the case studies to develop outcomes that are more than the 'sum of their parts'. In essence, this will see the theoretical and historical knowledge of the research team combining the applied and practical insights from the case studies to produce a synthesis.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