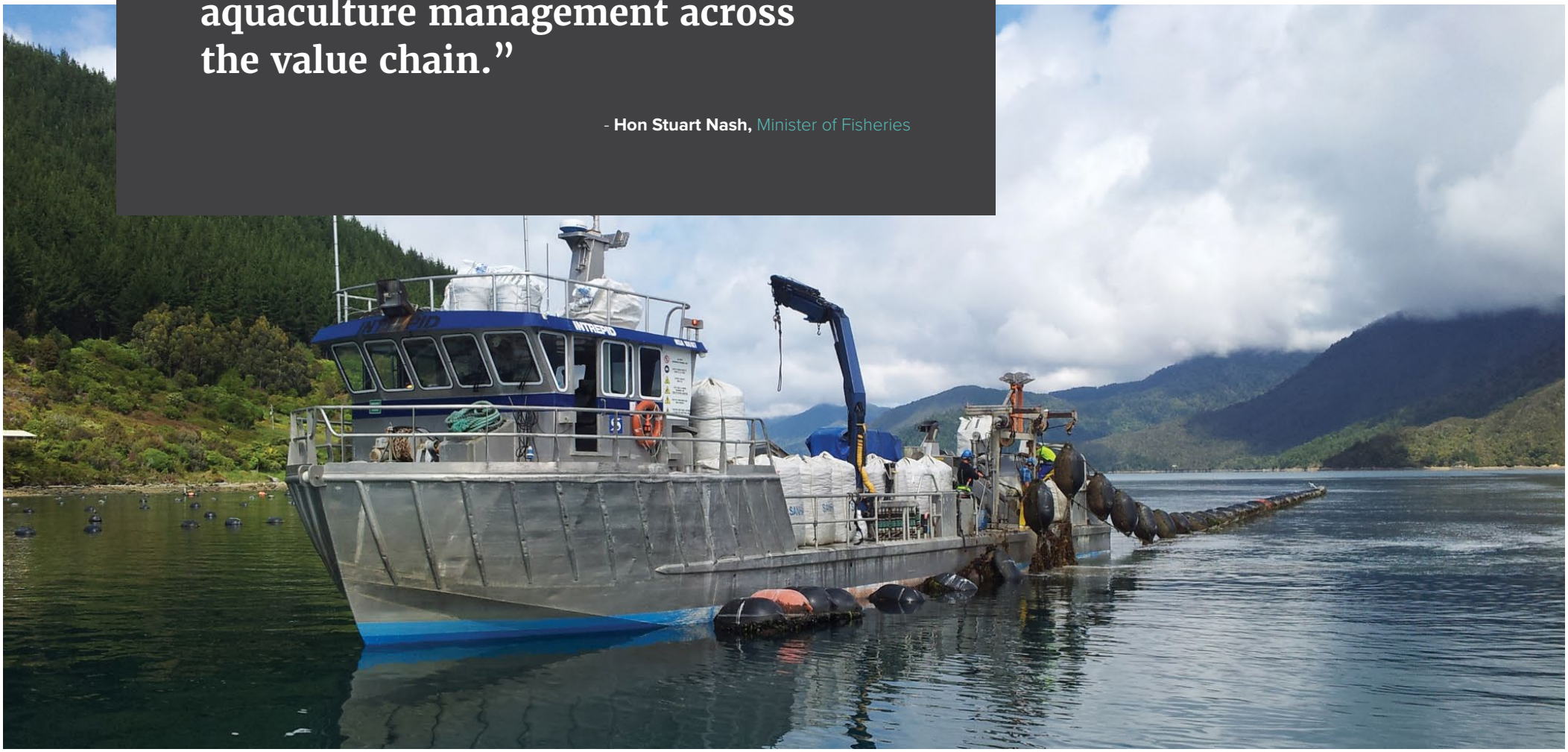
The New Zealand Government

Aquaculture Strategy

New Zealand Government

“My vision is that **New Zealand is globally recognised as a world-leader** in sustainable and innovative aquaculture management across the value chain.”

- **Hon Stuart Nash,** Minister of Fisheries



Minister's introduction

Aquaculture produces seafood and products that epitomise Brand New Zealand: sustainable, healthy and highly valued. Its development through innovation and best practice can enrich our communities and our global reputation. Aquaculture could be a much bigger part of our primary sector as we respond to the clear trends and forces shaping our future.

The context for change is clear: the need to reduce emissions and adapt to climate change, evolving consumer demands, and a spotlight on sustainability in international markets. New Zealand can't feed the world, but we can help meet growing demand for high quality, sustainably produced seafood.

In the face of change, I believe it's incumbent on us to pursue opportunities to strengthen our market position, to innovate, and to operate more sustainably.

My vision is that New Zealand is globally recognised as a world-leader in sustainable and innovative aquaculture management across the value chain.

Achieving this vision means building on our successes, and embracing new opportunities. New Zealand already occupies a unique position on the world stage, with a reputation for well-managed, safe, sustainable and nutritious food. We start the next steps of this journey from a strong position.

Based on its current $600+ million in annual sales, a strong record of growth, and opportunities for transformational development, there is a genuine opportunity for the aquaculture industry to reach $3 billion in annual sales by 2035.

This strategy outlines a sustainable growth pathway, and an all of Government work plan to support it. The growth pathway sets an objective for aquaculture to become a more productive industry that further supports regional prosperity. Innovation underpins this growth – both through improving the value from existing farming space, and exploring opportunities for new farming on land and in the open ocean.

The growth pathway also sets objectives of a sustainable, resilient and inclusive aquaculture industry. This means aquaculture will lead in environmental practices across the value chain; be strong and protected from external risks of pests, disease and climate change; and work in collaboration with Māori and communities to realise meaningful jobs, wellbeing and prosperity.

This strategy acknowledges and makes clear the Government's role in setting the right frameworks for growth, and enabling the industry to take hold of opportunities. Together we must ensure growth happens sustainably and respects other uses and values. We are partners on this journey.

This strategy also recognises the importance of partnering with iwi to ensure their values and aspirations, commercially, culturally and as kaitiaki, are provided for. This means going beyond legislative obligations and embracing true partnership.

This strategy is bold, and I make no apologies for that – we have an obligation to be bold about ensuring a sustainable, productive and inclusive future for our tamariki. Supporting sustainable industries like aquaculture will be essential to ensuring future generations have the high standards of wellbeing we owe them.

Hon Stuart Nash
Minister of Fisheries

The sustainable growth pathway

The challenge

The world's climate is changing, the global population is growing, and natural ecosystems are under increasing pressure. Consumers and regulators are increasingly demanding sustainability not just at the farm level, but across the value chain – from farm to plate.

Demand for premium seafood is high and is expected to grow

As the global population grows and gets wealthier, the global middle class is growing. Paired with heightened consumer awareness and connectivity, demand for healthy, sustainable and ethically produced seafood is increasing.

Most of the world's wild capture fisheries are at or near capacity. Aquaculture is the proven way to increase sustainable seafood production within the earth's environmental limits.

There is great potential for growth

New Zealand's aquaculture industry is well placed to help meet this demand and do so sustainably. Aquaculture is proven as an efficient way to produce protein. New Zealand has a strong record for sustainable and efficient aquaculture, nutritious seafood, and a world-leading food safety system.

We have the opportunity to strengthen Brand New Zealand and enhance our market position through becoming world-leading in circular economy thinking, through every stage of aquaculture. Aquaculture is well placed to be a bigger part of our future low emissions economy that advances New Zealand's wellbeing.

Key drivers of sustainable growth

This strategy acknowledges the potential for aquaculture to be a $3 billion industry by 2035, and be a more significant part of a lower emissions economy. There are three key drivers that make this goal achievable.

1. Maximising the value of existing farms through innovation

Aquaculture is and will continue to be a value success story. A strong innovation programme and co-investment between Government and industry have been key to New Zealand delivering premium, high value products to the world.

There is still scope for being more productive, efficient and sustainable, and deriving greater value from what we grow. Examples include mussel oils, powders and extracts; high value nutrition; and premium salmon. There are other opportunities on offer – such as through macro-algae farming to provide ecosystem services, buffering ocean acidification, and storing carbon.

> Over **half of all seafood** the world eats comes **from aquaculture.**

2. Extending into high value land-based aquaculture

Land-based aquaculture farms produce juvenile stock for growing to harvestable size in the sea. For marine aquaculture to grow, land-based hatcheries will also need to grow or increase their output.

There is potential for land-based aquaculture to further support marine aquaculture in a number of ways. This includes rearing juveniles that better withstand climate change, ocean acidification or pests and diseases. Land-based aquaculture also enables increased productivity by breeding juveniles that have marketable traits such as size or nutritional characteristics; and making better use of sea space by growing juveniles for longer before they are transferred to marine farms.

Land-based aquaculture also presents opportunities to farm right through to harvest. This includes precision growing to meet evolving market demands for high value seafood and extracts such as oils and powders.

3. Extending aquaculture into the open ocean

Aquaculture has traditionally taken place in sheltered, enclosed bays and harbours where there are other legitimate uses and values. Many areas have reached their social carrying capacity.

Both globally and in New Zealand, attention is turning to open ocean farming as the big opportunity for aquaculture growth.

Open ocean farming presents an opportunity to farm in cooler, deeper waters, and more easily position farms away from areas of high competing use. New Zealand's exclusive economic zone is 15 times bigger than our land area – presenting significant potential.

Open ocean farming outside of enclosed bays requires a technological shift – existing technology does not perform in open ocean environments. We can leverage work being undertaken globally to farm in high energy environments. We have the opportunity to develop and implement a world-leading framework for managing open ocean development, and ensure it integrates with existing uses and values. This will be a critical part of our work programme.

Our industry is on track to reach $1 billion in annual sales by 2025. Extending into the open ocean and on land are transformational opportunities for further growth.

Aquaculture can be extremely valuable for the space it uses. A 10 hectare salmon farm can be worth $140 million in annual revenue:

Comparison of the approximate annual value per 10 farmed hectares for different primary products	
Salmon	$140,000,000
Mussels	$850,000
Oysters	$800,000
Kiwifruit	$800,000
Dairy	$77,000
Sheep and beef	$8,500

Source: Zespri, Beef+Lamb, DairyNZ, AQNZ

The sustainable growth pathway

Towards our goal of $3 billion in annual sales by 2035

Current state

Existing industry

+ $600 m+ in annual sales
+ 3000+ regional jobs
+ Sustainable production
+ Efficient farming
+ $100 m in innovation
+ 7% average annual growth

Towards $1 billion

Maximise the value of existing farm space through a strong research, innovation and commercialisation system

Lift industry confidence to invest in growth across the work programme

Wharf and hatchery infrastructure to support growth

Beyond $1 billion

World-leading frameworks to enable sustainable open ocean and land-based farming – transformational growth away from many competing uses and values

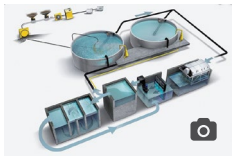
Extend farming into open ocean

World-leading trials of open ocean shellfish and seaweed farming

Enable transitional fish farms to build skills and expertise *(6m waves)*

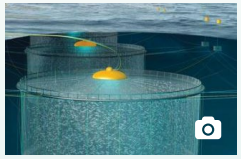
Extend farming onto land-based systems

Hatchery-raised juveniles for greater resilience, value and efficiency

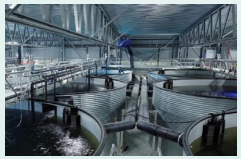


Growing juveniles for longer to make best use of space and avoid unfavourable conditions

Potential $3 billion industry



Open ocean farms *(11m waves)*



Farms producing high value seafood and extracts for market

Future state 2035

Future industry

+ $3 b+ in annual sales
+ 6000+ regional jobs
+ Sustainable lifecycle
+ Highly efficient farming

Image credit: AKVA group

Our four outcomes

Sustainable: A primary industry leading in environmentally sustainable practices across the value chain

Productive: Aquaculture growth supports regional prosperity

Resilient: Aquaculture is protected from biological harm and supported in adapting to climate change

Inclusive: Partnering with Māori and communities on opportunities to realise meaningful jobs, wellbeing and prosperity

About our strategy

This strategy is an all of Government work plan led by Fisheries New Zealand, closely supported by the Department of Conservation and the Ministry for the Environment. The following pages set out the outcomes, objectives and actions necessary to deliver on the Government's vision and goal for aquaculture.

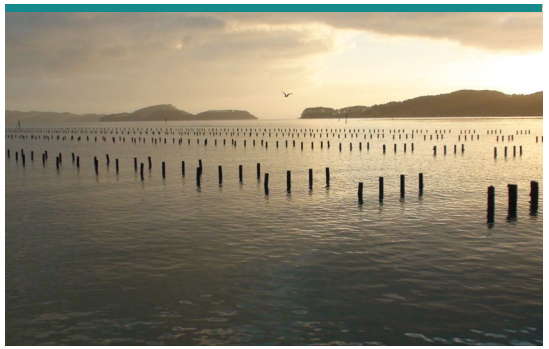
We will partner with other relevant agencies, industry, Māori, councils and communities to facilitate sustainable, productive and inclusive aquaculture growth in the coast, open ocean and on land. We will help ensure the industry is resilient to biological harm and supported in adapting to climate change.

Aquaculture mostly occurs in public space. Our commitment is that we will always ensure aquaculture growth is environmentally sustainable and takes into account other uses and values of the coast and waterways.

We will also ensure iwi and broader Māori aspirations, including kaitiakitanga, are promoted throughout the work programme.

This strategy is not a statutory instrument. It will be implemented consistently with existing regulatory requirements, such as regional councils' coastal plans, and statutory policy, such as the New Zealand Coastal Policy Statement.

Our strategy



Our vision:

New Zealand is globally recognised as a world-leader in sustainable and innovative aquaculture management across the value chain.

Our goal:

$3 billion in annual sales by 2035.

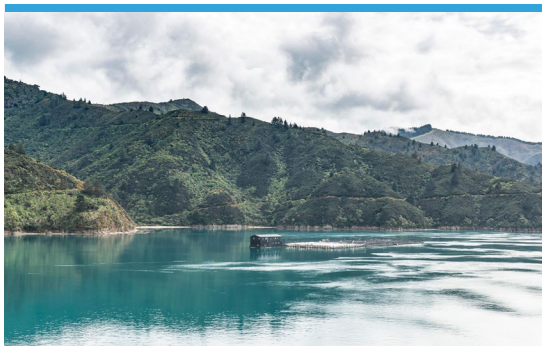
Our outcomes

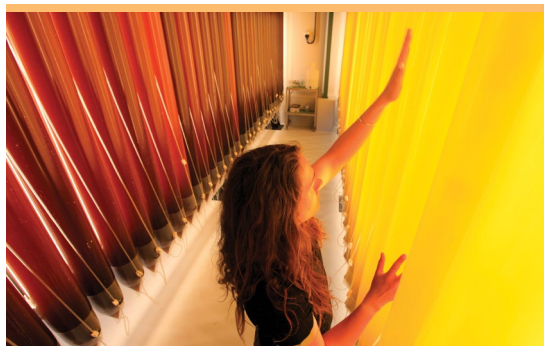
Sustainable

A primary industry leading in environmentally sustainable practices across the value chain.

Our objectives

+ Promote and assist implementation of strategic integrated coastal and catchment planning to ensure a healthy aquatic environment.
+ Partner with industry on a transition plan to reduce emissions and waste across the value chain.





Productive

Aquaculture growth supports regional prosperity.

+ Maximise value of all farmed space through a strong research, innovation and commercialisation system.
+ Develop world-leading frameworks for open ocean and land-based farming.
+ Support infrastructure needs to enable growth.

Resilient

Aquaculture is protected from biological harm and supported in adapting to climate change.

+ Strengthen biosecurity management.
+ Support the industry to adapt to climate change.

Inclusive

Partnering with Māori and communities on opportunities to realise meaningful jobs, wellbeing, and prosperity.

+ Build Māori and community knowledge about aquaculture and their input into growth opportunities.
+ Deliver the Crown's aquaculture settlement obligations in a manner that facilitates early investment in new opportunities.
+ Recognise Māori values and aspirations across the work programme.

Outcome 1 – Sustainable

A primary industry leading in environmentally sustainable practices across the value chain

Sustainability is at the heart of this strategy.

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. We must now extend sustainability from the farm to circular economy thinking across the value chain.

We will work towards more strategic integrated coastal and catchment planning and monitoring approaches. This will ensure the cumulative effects of aquaculture and other activities are managed and a healthy aquatic environment and water quality are maintained and enhanced.

We will encourage practices that support environmental regeneration and improve the health of the aquatic environment.

We will develop a transition plan with the industry to reduce waste and emissions across the value chain and to achieve net zero carbon emissions by 2050.

Alignment with UN Sustainable Development Goals

Objective and strategic shift

Promote and assist implementation of strategic integrated coastal and catchment planning to ensure a healthy aquatic environment

Sector- and issue-based management → Strategic planning across activities and legislation

Actions

+ Identify regions to test strategic integrated planning and ecosystem-based management and monitoring across uses and legislation.
+ Continue to improve environmental performance through development of best practice standards and new technologies to mitigate environmental effects.
+ Build on the beneficial ecosystem services of aquaculture, including restoring shellfish reefs, and supporting biodiversity and wild populations.
+ Develop and implement indicators of overall aquatic health.
+ Better enable coastal occupation charges to improve monitoring and coastal management.
+ Work with the Sustainable Seas National Science Challenge on tools to improve coastal and catchment management.

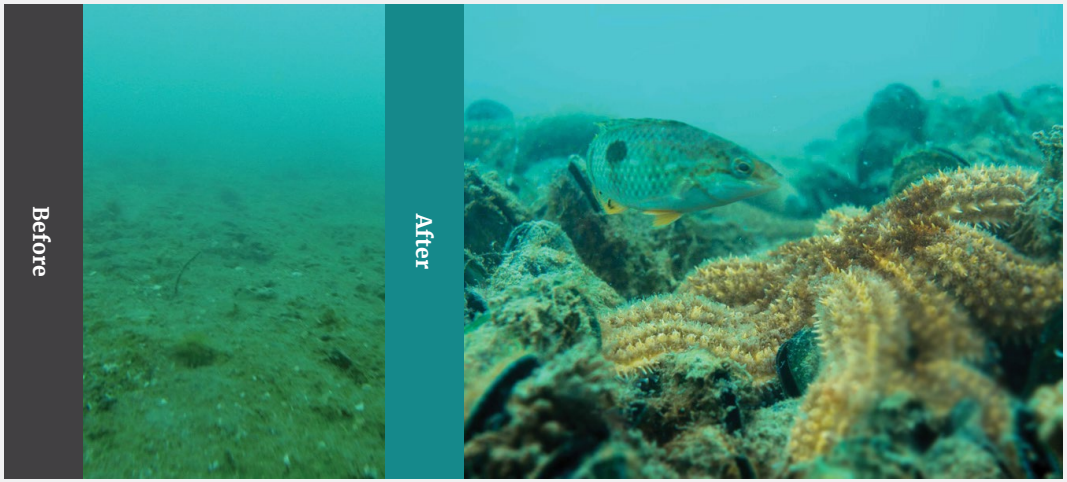
Objective and strategic shift

Partner with industry on a transition plan to reduce emissions and waste across the value chain

Sustainable farming → Sustainable across the value chain

Actions

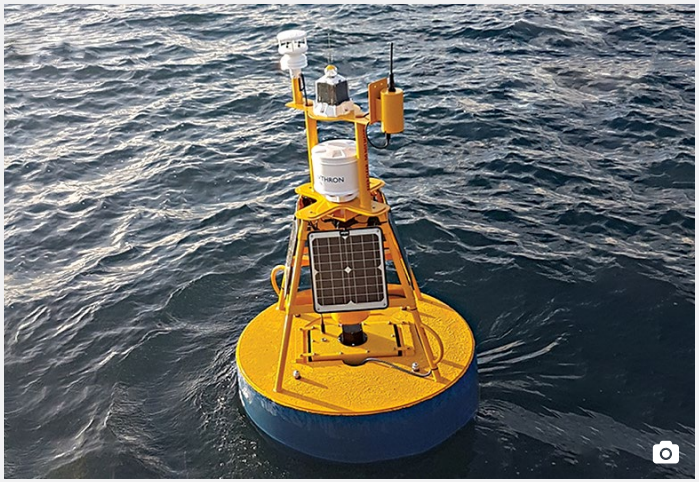
+ Conduct lifecycle assessments for salmon, oyster and mussel farming and develop a waste and emissions transition plan.
+ Foster connections with other primary sectors to share and partner innovations in packaging, processing and transportation.
+ Support seafood branding and third party certification based on the sustainable attributes of the industry.
+ Assess the ability of seaweeds and shellfish to sequester carbon and buffer ocean acidification.



Mussel reef restoration and ecosystem services

In the past, shellfish reefs were ecologically important features of the Hauraki Gulf and the Marlborough Sounds, which are now important mussel farming areas. We are working in partnership with industry and environmental organisations to restore lost shellfish beds and reefs. Restored mussel beds in the Gulf were found to have ten times more small fish, four times more invertebrates, and six times the productivity of bare seafloor.

Mussel farms have been shown to be some of the most biodiverse areas remaining on our coasts.



Smart farming

Government is investing in greater connectivity, innovations in sensors, and artificial intelligence to drive improved monitoring, and real-time information and data analysis. These developments will enable better farm management and monitoring of environmental health. Greater on-farm information will support precision farming to lift productivity while reducing farm servicing requirements and carbon emissions.

The Government is also investing in the Moana Project, which aims to vastly improve our understanding of coastal ocean circulation, and ocean forecasting to provide information that supports sustainable growth of marine industries such as aquaculture.

Image credit: Cawthron Institute

Outcome 2 – Productive

Aquaculture growth supports regional prosperity

Research and innovation underpin this strategy.

Aquaculture in New Zealand is a young industry. 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.

The technology is also advancing rapidly to extend the industry into more exposed and open ocean sites, and into modern, efficient land-based systems.

To be successful we need new management frameworks to guide this growth, to support the large investments required, and address the infrastructure needs to enable growth.

Alignment with UN Sustainable Development Goals

Objective and strategic shift

Maximise the value of all farmed space through a strong research, innovation and commercialisation system

Strong research system → Strong research and commercialisation

Actions

+ Facilitate co-investment between industry, iwi and government in priority research and innovation.
+ Identify how government could de-risk the transition stage between research and commercialisation to accelerate development.
+ Support the implementation of the National Environmental Standards for Marine Aquaculture to create confidence to invest and enable changes to trial new species and technologies.

Objective and strategic shift

Develop world-leading frameworks for open ocean and land-based farming growth

Predominately inshore marine farming → Inshore, land-based and open ocean farming

Actions

+ Work with partners to enable a collaborative fit-for-purpose management framework for open ocean farming.
+ Ensure the land-based aquaculture regulations are fit for purpose.
+ Consider future frameworks to support growth through the Resource Management, Fisheries, and Biosecurity Act reforms.
+ Develop a strategic investment plan to facilitate emerging open ocean and land-based technology.

Objective and strategic shift

Support infrastructure needs to enable growth

Legacy infrastructure at capacity → Planned approach to infrastructure development

Actions

+ Work with industry and partners to identify the infrastructure required to enable growth.
+ Work with industry to support planned development of hatchery infrastructure to improve value and resilience.
+ Facilitate co-investment in priority infrastructure.

The Government will lead development of a framework to manage open ocean farming

New Zealand is already world-leading in the development of open ocean shellfish farm technology. The technology to farm salmon and other fish in the open ocean is advancing rapidly and expected to be commercialised within 10 years. This is a transformational opportunity for aquaculture growth. The Government will support the industry to realise this opportunity.

We will need transitional and trial sites to build skills and the scale to invest

The goal is open ocean farming away from many competing uses and values

A multi-interest working group process is underway. It is considering:

- How should growth be managed and allocated, including Māori settlement?
- Constraints mapping to identify suitable areas for growth in our open ocean.
- The supporting infrastructure and investment needed to enable growth.

Image credit: SalMar

Outcome 3 – Resilient

Aquaculture is protected from biological harm and supported in adapting to climate change

Building resilience safeguards the aquaculture industry.

Sustainably growing the aquaculture industry requires strong supporting foundations and management of risk.

Biosecurity is important to all primary industries. Recent years have shown aquaculture is not immune to the impacts of pests and diseases.

Climate change is also a considerable challenge. Ocean acidification and warming will impact aquaculture. Understanding the likely effects requires research and effective transfer of that research into farming practices.

We will work together to ensure biosecurity and climate adaptation plans are robust to protect our environment while supporting the opportunities for growth.

Alignment with UN Sustainable Development Goals

Objective and strategic shift

Strengthen biosecurity management

Reactive biosecurity response → Planned and active management

Actions

+ Progress a Government Industry Agreement with Aquaculture New Zealand.
+ Support implementation of biosecurity management standards through the National Environmental Standards for Marine Aquaculture.
+ Identify options for broader marine pathway management across coastal users through the Biosecurity Act reforms.

Objective and strategic shift

Support the industry to adapt to climate change

Emerging consideration → Comprehensive and planned approach

Actions

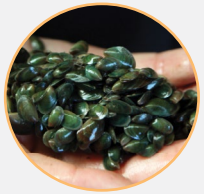
+ Forecast the effects of climate change on the aquatic environment. Plan and support actions for resilience and adaptation.
+ Support industry to transition to selective breeding and biome technology to improve value and resilience.
+ Support an industry-led spat strategy to safeguard from the impacts of climate change and provide for planned growth.

Unlocking the power of selective breeding and juvenile health

Aquaculture researchers are working on how to grow strong, healthy juveniles to increase productivity, efficiency and resilience. Research includes looking at ideal diets, probiotics, stock health and behaviour, and selective breeding for desirable traits. Estimates are that an additional 40-80% productivity will be gained through the roll-out of hatchery-reared mussel spat across the industry.

On land we have bred stock for thousands of years for value, desirable characteristics and different environments

Selective breeding can drive significant gains



Selective breeding in **aquaculture** is still in its infancy

- **Resilience gains to a changing environment:** temperature, pH, diseases and pests
- **Farming and processing efficiency gains:** better survival, feed conversion, uniform size
- **Value gains:** growth rate, market-desired traits such as colour, extract concentrations

Above: Research is beginning into how climate change over the next 100 years could affect our aquaculture species.

Above: We are working with industry to ensure every aquaculture farm has a biosecurity plan in place.

Outcome 4 – Inclusive

Partnering with Māori and communities on opportunities to realise meaningful jobs, wellbeing, and prosperity

Māori and communities will benefit from this strategy.

The Government has been working with regions to realise growth opportunities, including some of our regions that are most challenged by low employment and incomes.

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.

The Government will engage with councils, Māori and communities to understand local priorities and to help enable community-led initiatives and regional growth opportunities. This includes building social licence to support aquaculture growth.

Alignment with UN Sustainable Development Goals

Objective and strategic shift

Build Māori and community knowledge about aquaculture and their input into growth opportunities

Working towards growth → Engaging with Māori and communities on opportunities

Actions

+ Engage with Māori and communities on local and regional priorities to help enable community-led initiatives.
+ Implement greater information sharing and a proactive communications approach.
+ Work to develop aquaculture training programmes to build the skills and workforce to meet industry needs.

Objective and strategic shift

Deliver the Crown's aquaculture settlement obligations in a manner that facilitates early investment in new opportunities

Delivering the settlement → Maximising the opportunities from settlement

Actions

+ Conclude the review of the New Space Settlement Plan.
+ Commission an independent evaluation of the benefits of the aquaculture settlement to assess whether improved mechanisms could better advance Crown and iwi aspirations.
+ Ensure open ocean farming enables early settlement and investment opportunities for Māori business growth.
+ Review the Māori Commercial Aquaculture Claims Settlement Act to improve the asset allocation process.

Objective and strategic shift

Recognise Māori values and aspirations across the work programme

A focus on aquaculture settlement	→ A focus on tikanga values, aspirations and settlement

Actions

+ Recognise and provide for Māori values and aspirations including kaitiakitanga across our work.
+ Partner with Māori on aquaculture opportunities including open ocean farming to assist early investment and participation.
+ Continue to support historical Treaty of Waitangi settlement negotiations involving aquaculture space.

Realising the benefits of aquaculture to New Zealand communities

Above: Council, iwi and community are working together with government agencies to lift employment and prosperity through New Zealand's first commercial-scale open ocean mussel farm in Ōpōtiki.

Above: High school students in the Far North are making a positive contribution to their communities and the environment by running their own oyster farming business with help from Papa Taiao Earthcare and Moana New Zealand.

Sea Change – Tai Timu Tai Pari Hauraki Gulf Marine Spatial Plan

Sea Change – Tai Timu Tai Pari Hauraki Gulf Marine Spatial Plan was developed by a collaborative working group representing mana whenua, environmental groups and the primary sector. It aimed to secure a healthy productive and sustainable future for the Hauraki Gulf, including aquaculture. The process recognised that working in partnership and empowering mana whenua and a wide range of stakeholders was the best way to get the most enduring outcomes for the Hauraki Gulf. Some key next steps are to contribute to a government response to the Sea Change Plan, and apply what we've learned to other regions.

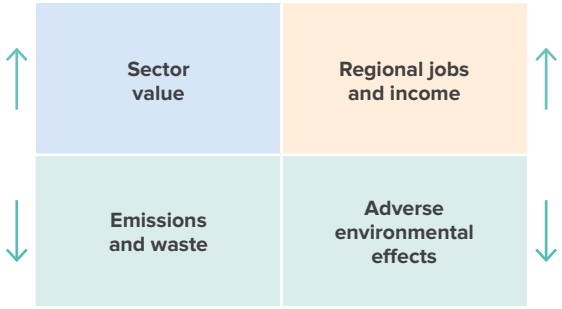
Delivering our strategy

Timeframe

This strategy will be reviewed in 2025, but is intended to position New Zealand for a significantly longer timeframe. It recognises the long term issues of climate change, biodiversity loss and global population growth – issues relevant well beyond 2025.

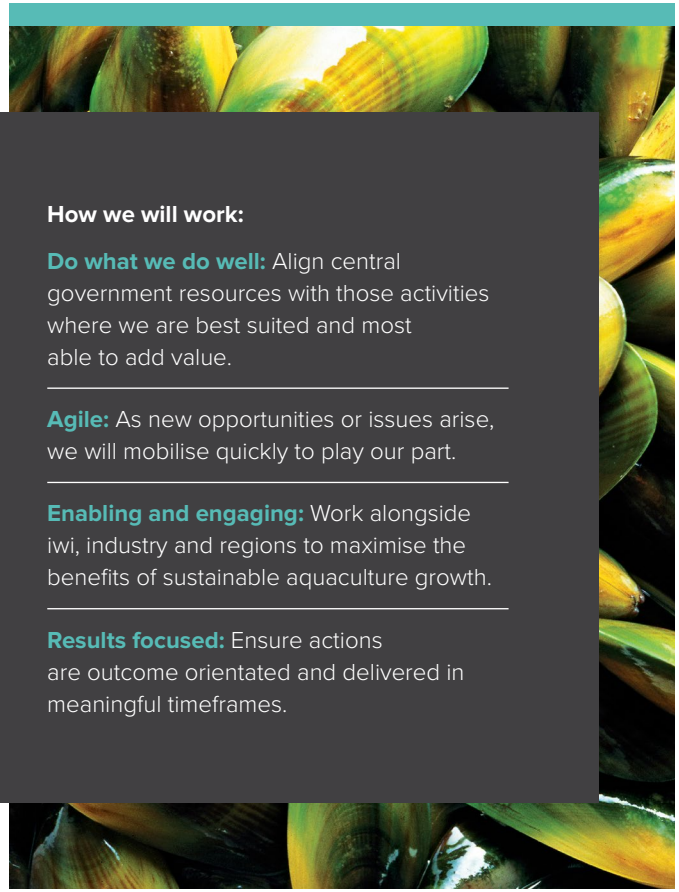
Four measures of success

We will use four simple measures to gauge the success of this strategy.



An annual implementation plan

The Government will publish an annual implementation plan setting key actions for the year and the agencies responsible.



How we will work:

Do what we do well: Align central government resources with those activities where we are best suited and most able to add value.

Agile: As new opportunities or issues arise, we will mobilise quickly to play our part.

Enabling and engaging: Work alongside iwi, industry and regions to maximise the benefits of sustainable aquaculture growth.

Results focused: Ensure actions are outcome orientated and delivered in meaningful timeframes.

The primary agencies involved in delivering this strategy

+ Fisheries New Zealand and the wider Ministry for Primary Industries
+ The Department of Conservation
+ The Ministry for the Environment
+ Te Puni Kōkiri
+ The Office for Māori Crown Relations – Te Arawhiti
+ The Ministry of Business, Innovation and Employment
+ New Zealand Trade and Enterprise

Industry at a glance

$600 million in sales in 2018

3,000+ jobs in New Zealand communities

7% average annual growth since 2012

Top 5 products by export value

Frozen half shell mussels
49% $229.9 m

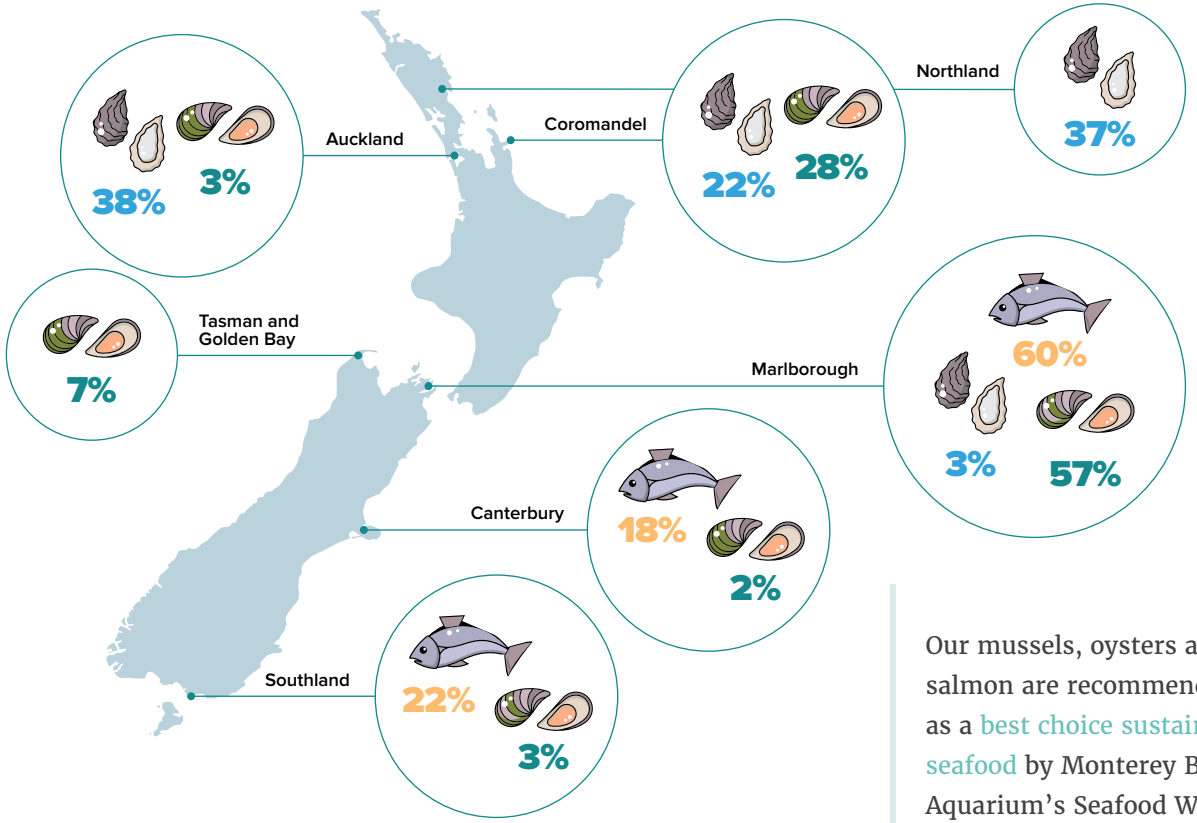
Chilled gilled & gutted salmon
17% $79 m

Mussel oil
5% $26.5 m

Frozen whole mussels
4% $19 m

Frozen oysters
3% $17.2 m

Major aquaculture areas



Our mussels, oysters and salmon are recommended as a best choice sustainable seafood by Monterey Bay Aquarium's Seafood Watch

New Zealand Government

ISBN: 978-1-99-000832-0 (print) ISBN: 978-1-99-000833-7 (online)