



# **Economic assessment of the Marlborough Sounds Aquaculture Fast-track proposal**

**NZIER report to Aquaculture Direct Limited**

October 2026



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## Authorship

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The assistance of Aquaculture Direct Limited and Sarah Spring (NZIER) is gratefully acknowledged.

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## Key points

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### This report supports a Fast-track application

Aquaculture Direct Limited (ADL) commissioned NZIER to assess the regional and national economic impacts of the Fit for a Changing World – Marlborough Aquaculture proposal to support an application under the Fast-track Approvals Act 2024 (FTAA). The project has been referred under application FTAA-2511-1144.

Although this is not an Environment Court proceeding, the authors of this report have read the Environment Court's Code of Conduct for Expert Witnesses in the Practice Note 2023, and agree to comply with it. We confirm that the issues addressed in this statement of evidence are within our area(s) of expertise, except where we state that we are relying on the opinion of others. We have not omitted to consider material facts known to us that might alter or detract from the opinions expressed.

We have no commercial relationship with the applicants, save in our role as a provider of technical services and as an expert in relation to this application.

### The aquaculture project comprises six developments

The programme comprises six complementary aquaculture developments in the Marlborough Sounds: three Greenshell™ mussel nurseries, two Greenshell™ mussel crop farms and one flat oyster farm.

Together, the developments expand nursery capacity, increase harvest capacity and diversify aquaculture production. While they are six separate projects, together they represent an integrated investment in Marlborough's aquaculture production system.

### We use an economy-wide approach

NZIER uses its regional computable general equilibrium (CGE) model, TERM-NZ, to estimate the economic impacts of both the construction and long-term operation of the proposed developments.

### Significant positive returns will be generated from this investment

Our modelling indicates that the proposed developments will generate significant positive economic impacts for Marlborough. The largest and most enduring benefits arise during the operational phase through increased production, exports, employment and household income.

We estimate the projects will:

- increase annual Marlborough gross domestic product (GDP) by approximately **\$84.4 million**
- increase annual Marlborough household spending by **\$39.8 million**
- support approximately **222 employees** in Marlborough



- over a 30-year assessment period, the present value of the increase in Marlborough GDP and household spending is estimated at **\$865 million and \$409 million respectively**.

These are economically significant in the context of Marlborough's estimated GDP of \$4.5 billion.

We also estimate the project will:

- increase national GDP by \$1,283 million over 30 years
- increase central government revenue by \$743 million over 30 years.

### Impacts are wider than increased GDP

In addition to the quantified economic impacts, we expect the proposed developments to improve the resilience and reliability of the mussel seed supply, increase the productivity of hatchery-produced spat, add mussel production, diversify aquaculture production through commercial flat oyster farming, and increase the utilisation of Marlborough's existing processing, transport and marine infrastructure.

The ecological assessments accompanying the application conclude that, provided the embedded design measures and management commitments are implemented, residual adverse effects on all ecological domains are anticipated to be no more than minor (Robertson Environmental 2026). Peer-reviewed landscape assessments find effects to be localised and conclude that the proposals would not materially compromise the landscape and natural character values of the wider receiving environment. Several broader environmental and community benefits have been identified but cannot yet be robustly quantified. We therefore do not include an economic valuation of environmental impacts in the modelling results.

### This investment will have a positive regional impact

The proposed developments generate positive regional and national economic outcomes. Our modelling indicates that the projects strengthen Marlborough's productive capacity and increase production, exports, employment and regional incomes. As we do not monetise several broader economic, environmental and societal benefits, the quantified impacts presented in this report should be regarded as conservative estimates of the project's overall contribution.



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# 1 Purpose and conclusions

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## 1.1 Project purpose

Aquaculture Direct Limited (ADL) engaged NZIER to undertake an economic assessment of the Fit for a Changing World – Marlborough Fast-track Aquaculture Projects as part of an application under the Fast-track Approvals Act 2024 (FTAA). The FTAA is designed to facilitate infrastructure and development projects that deliver significant regional or national benefits. This report presents the economic analysis undertaken to inform the Fast-track Approvals Panel of the likely regional and national economic impacts of the proposed aquaculture developments.

Our assessment began with a review of the application material and supporting technical documentation to understand the proposed developments, the interactions among the six applications, and their contribution to the wider aquaculture production system. Using this information, we developed a series of economic scenarios and applied our regional computable general equilibrium (CGE) model, TERM-NZ, to estimate the regional and national economic impacts of both the construction and the operation of the proposed developments. We also considered the broader economic and non-market benefits identified in the application material, including environmental and wider societal outcomes that conventional measures of economic activity do not capture.

This report describes the proposed developments and the production system they support, outlines the economic assessment framework, modelling methodology and assumptions, presents the estimated economic impacts of the developments, and discusses the broader economic and non-market benefits of expanding aquaculture production in the Marlborough Sounds.

## 1.2 Project findings

The six developments are expected to provide material and enduring economic benefits. They constitute a connected programme rather than six unrelated activities: the nursery sites increase the supply and reliability of juvenile mussels, the crop sites provide additional grow-out capacity, and the flat-oyster site introduces a new product to the regional aquaculture system.

The construction effects are positive but temporary. Persistent long-term effects arise once the projects are operating at scale. The modelling indicates an annual increase in Marlborough gross domestic product (GDP) of \$84 million and an annual increase in Marlborough household spending of \$40 million. Over 30 years, the present value of the estimated Marlborough GDP effect is \$865 million, and the household spending is \$409 million at the Treasury-approved 8 percent discount rate.

Final economic outcomes will depend on where the production supported by the nursery developments ultimately occurs. Some juvenile mussels (seed) may be transferred to existing farms in Marlborough, while others may be used elsewhere in New Zealand. Processing may also take place within or outside the region. The report therefore presents two scenarios rather than a single point estimate.



The projects also deliver benefits that are not fully captured by the model, including greater security and resilience of the seed supply, increased capacity to accommodate hatchery-produced spat, species diversification, and greater use of shared regional infrastructure and skills. The application material also identifies environmental benefits and potential environmental costs. These latter effects are relevant, but the underlying physical changes have not been quantified sufficiently to support reliable monetary estimates.

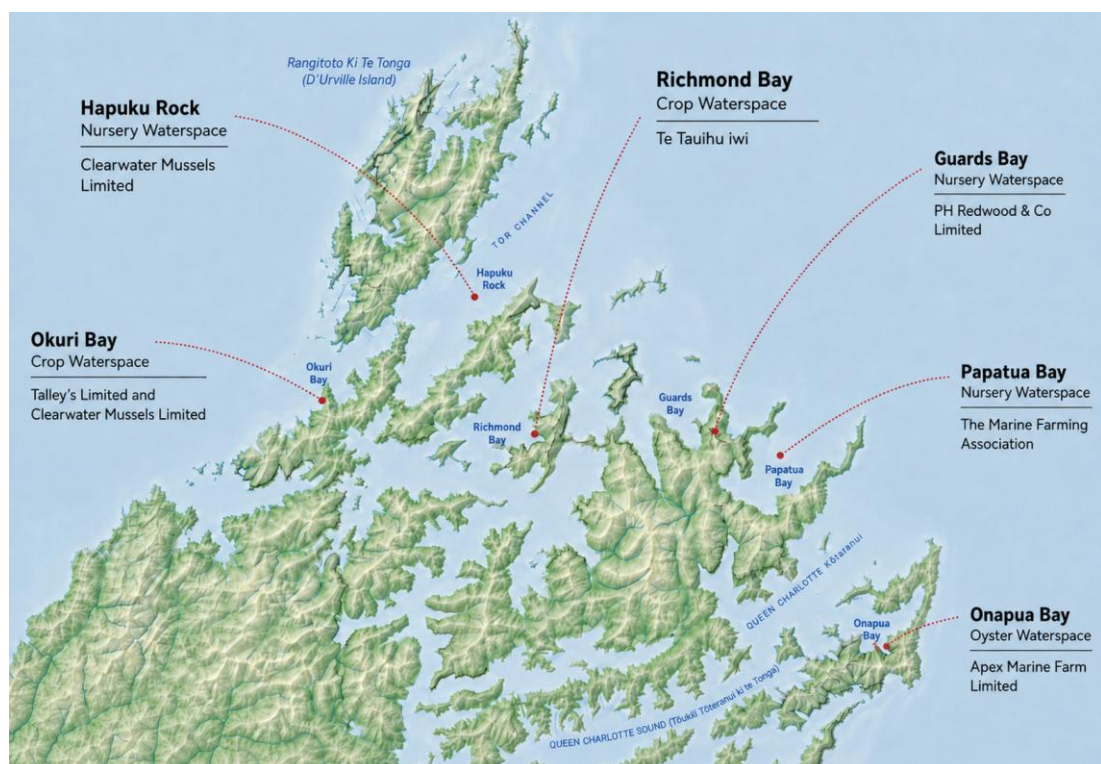


## 2 Project overview

### 2.1 Overview of the six developments

The proposed programme comprises three Greenshell™ mussel nursery developments, two Greenshell™ mussel crop developments, and one flat oyster development. Collectively, the projects would establish approximately 280 hectares of new waterspace across 12 marine farm blocks. The mussel developments include approximately 340 longlines. Figure 1 highlights the location and the applicant for each of the six sites (Aquaculture Direct Limited 2025a).

**Figure 1 Map of proposed developments**



Source: Aquaculture Direct Limited (with AI picture edits)

**Table 1 Proposed developments**

Area in hectares

| Site         | Development    | Applicant                             | Area  | Sites | Longlines |
|--------------|----------------|---------------------------------------|-------|-------|-----------|
| Papatua      | Mussel nursery | Marine Farming Association            | 90.00 | 1     | 96        |
| Guards Bay   | Mussel nursery | P H Redwood & Co. Ltd                 | 78.47 | 1     | 100       |
| Hapuku Rock  | Mussel nursery | Clearwater Mussels Ltd                | 28.03 | 2     | 35        |
| Okuri Bay    | Mussel crop    | Talley's Ltd / Clearwater Mussels Ltd | 27.89 | 2     | 37        |
| Richmond Bay | Mussel crop    | Te Taihū iwi                          | 42.17 | 3     | 72        |
| Onapua Bay   | Flat oyster    | Apex Marine Farm Ltd                  | 15.73 | 3     | 66        |

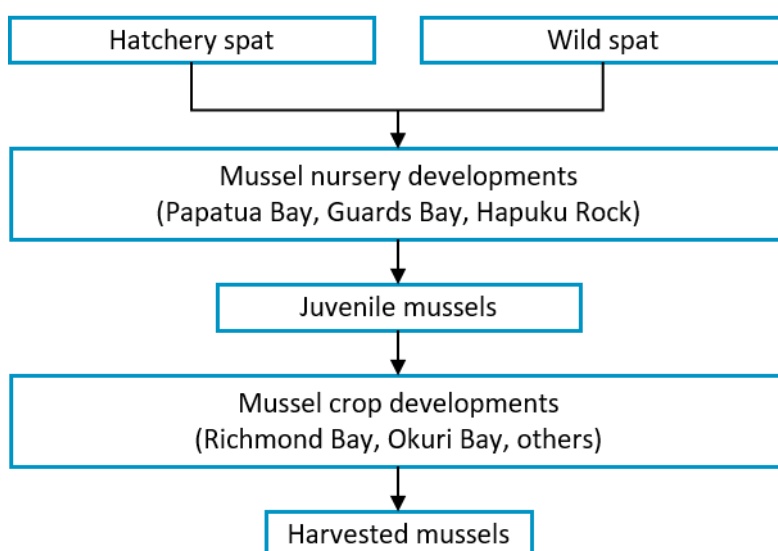
Source: Aquaculture Direct Limited

Together, these developments can remove constraints on future aquaculture production by expanding the seed supply, increasing grow-out capacity and introducing commercial flat oyster production. Viewed collectively, these applications represent an integrated investment in the resilience and productive capacity of Marlborough's aquaculture sector.

## 2.2 How the projects work together

The nursery and crop stages represent successive stages of the Greenshell™ mussel production system. Wild-caught or hatchery-produced spat are first transferred to nursery lines where they are grown into seed mussels. The seed is then transferred to crop farms, where mussels are grown to harvestable size before entering the processing and export market (Figure 2).

**Figure 2 Relationship between proposed mussel developments**



Source: NZIER based on Aquaculture Direct Limited

This distinction is fundamental to our economic assessment. The nursery developments do not, in themselves, produce harvestable mussels. Instead, they increase the supply of seed available to downstream growers. Consequently, the reported *production supported* by the nursery developments represents the additional harvestable production enabled by the nurseries, rather than the physical output or sale value of seed produced at those sites.

The proposed crop farms provide additional capacity to utilise some of this increased seed supply. However, the nurseries are not limited to supplying the proposed crop farms. Seed may also be transferred to existing farms within Marlborough or to farms elsewhere in New Zealand, depending on commercial arrangements.

The Onapua Bay project follows a different production pathway because oysters are grown to harvest on the application site. It will share many of the same marine infrastructure, processing facilities and service industries as the mussel sector.

## 2.3 Contribution of each development

### 2.3.1 Mussel nursery developments

The Papatua, Guards Bay and Hapuku Rock developments are designed to expand nursery capacity for Greenshell™ mussels. Increased nursery capacity is expected to improve spat retention and juvenile survival, increase utilisation of available wild spat, facilitate greater use of selectively bred hatchery spat, and improve the reliability of the seed supply. Collectively, these improvements reduce one of the principal constraints on future industry productivity – nursery line space for growing mussels from spat to seed size.

While all three nurseries perform the same biological function, they differ in their proposed operating models. Papatua will be operated by the Marlborough Farming Association Inc and is intended to provide nursery lines for lease to its 130 grower members via ballot, with 17.7 percent of the lines reserved for Te Taihu iwi. Guards Bay is designed primarily to secure sufficient mussels to optimise operation of the P H Redwood & Co. Ltd mussel factory, with potential to support other growers. Clearwater Mussels Ltd will operate Hapuku Rock and will expand an existing nursery site that has demonstrated above-average spat retention. Seed mussels will be transferred to existing crop sites including the proposed Okuri Bay development.

### 2.3.2 Mussel crop developments

The crop developments at Okuri Bay and Richmond Bay provide additional water space for growing mussels through to harvest. The mussels transferred from nursery sites would be seeded onto crop lines and grown to harvestable size before being transported for processing.

Okuri Bay is to be operated by Clearwater Mussels Ltd and Talley's Ltd, and is complementary to the nursery developments, particularly Hapuku Rock. Okuri Bay provides important Outer Sounds growing conditions to smooth overall production. Richmond Bay is proposed on behalf of the eight Te Taihu<sup>1</sup> iwi. The proposed iwi allocation of Papatua nursery lines would provide sufficient nursery capacity to support the development of the Richmond Bay crop farm.

### 2.3.3 Flat oyster development

The Onapua Bay proposal would re-establish commercial farming of native flat oysters in Marlborough. In addition to increasing shellfish production, the project would broaden the region's aquaculture base by introducing a complementary high-value species. If, for regulatory or operational reasons flat oysters cannot be farmed, the site will be used for Greenshell mussels.

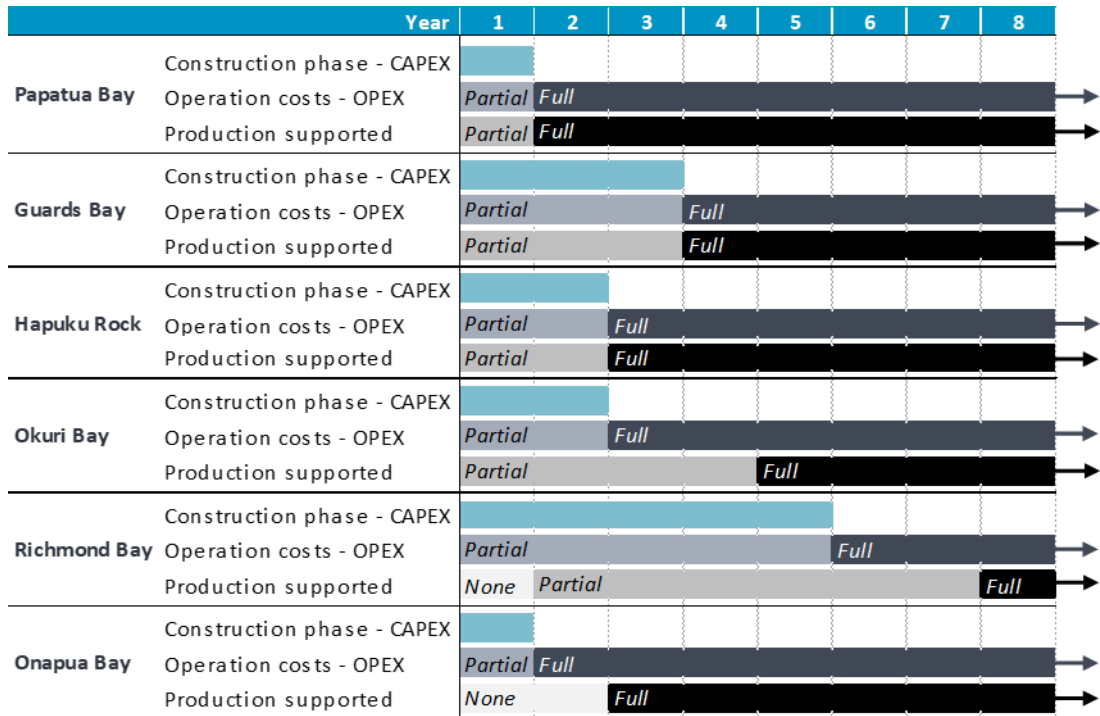
## 2.4 Project staging

The six developments are expected to be implemented over different time frames, with capital expenditure (CAPEX) occurring during the establishment phase and production increasing progressively as farms become operational. In our modelling, we treat the projects as a coordinated investment. Figure 3 highlights the project staging for each site,

<sup>1</sup> We note the different spellings of 'Te Taihu' and 'Te Tau Ihu'. The former spelling seems more prevalent in the documents related to the Fast-track application. We would look to be guided by mana whenua on their preferred spelling of their rohe.

including when CAPEX, operational expenditure (OPEX), and production are established. All sites are expected to be fully operational by year five. The project staging has been provided by ADL.

**Figure 3 Project staging**



Note: Timing based on data provided on 12 August 2026. We understand it may be revised which can affect economic impacts.

Source: NZIER

At full operation, we estimate the developments will support approximately 45,638 green-weight tonnes (GWT) of annual production, equivalent to a wharf price production value of approximately \$76.3 million and potential export revenue of approximately \$275.3 million (2026 NZ dollars). The total reported CAPEX across the six developments is \$11.15 million.

For each site, the proportion of spat sourced from Te Hiku o te Ika / Te Oneroa-a-Tōhe and hatcheries varies. All production assumptions are based on the production documentation provided, including the spat sourcing ratios, yields, and the proportion of lines completed over time. We assume that the spat sourcing proportions observed in Year 5 remain constant for each site in subsequent years. Greater use of hatchery spat would result in higher production, and therefore greater economic impacts, due to its higher yield. Annual production estimates reflect both the spat sourcing mix and the proportion of total lines completed in each year.

Table 2 summarises the expected production and export values for each development once fully operational. ADL provided estimates of production supported (GWT), indicative wharf prices, and export prices. Using these client-supplied data, we estimated the production value supported and annual potential export revenue for each development. These estimates form the basis of the production shocks used in the CGE modelling.



**Table 2 Production enabled from investments**

| Site         | Production supported (GWT) | Production value supported (\$ million) | Annual potential export revenue (\$ million) |
|--------------|----------------------------|-----------------------------------------|----------------------------------------------|
| Papatua Bay  | 20,570                     | 33.9                                    | 122.4                                        |
| Guards Bay   | 14,331                     | 23.6                                    | 85.3                                         |
| Hapuku Rock  | 7,914                      | 13.1                                    | 47.1                                         |
| Okuri Bay    | 1,095                      | 1.8                                     | 6.5                                          |
| Richmond Bay | 1,613                      | 2.7                                     | 9.6                                          |
| Onapua Bay   | 115                        | 1.2                                     | 4.4                                          |
| <b>Total</b> | <b>45,638</b>              | <b>76.3</b>                             | <b>275.3</b>                                 |

Source: NZIER

Although the biological production pathway is well understood, there remains uncertainty about where the additional production will ultimately occur. The supporting documentation indicates that nursery-grown seed may supply both existing and future crop farms in Marlborough or elsewhere in New Zealand. Likewise, harvested shellfish may be processed within or outside the region depending on commercial arrangements. These uncertainties do not affect the estimated increase in national production, but they do influence the regional allocation of economic activity within the CGE model.

## 2.5 Broader strategic benefits

In addition to increasing shellfish production, the proposed developments would strengthen the resilience and productive capacity of Marlborough's aquaculture sector. According to the project documentation, the programme would:

- improve the reliability and resilience of mussel seed supply
- make more efficient use of available wild spat
- facilitate greater use of hatchery-produced and selectively bred spat
- provide additional crop capacity for future industry growth
- diversify regional aquaculture through commercial flat oyster production
- support iwi participation in aquaculture through the Richmond Bay development and allocated line space in Papatua
- increase demand for shared marine infrastructure, environmental monitoring, engineering, transport, processing and professional services.

## 3 Economic context

### 3.1 Marlborough's economy

Marlborough has a high-value, export-oriented economy centred on primary production and associated manufacturing. Regional GDP was approximately \$4.3 billion for the year



ended March 2024 (Ministry of Business, Innovation, and Employment 2025). GDP per capita was \$84,288, around 8 percent higher than the national average of \$78,233 (Table 3).

**Table 3 GDP per capita, Marlborough and New Zealand**

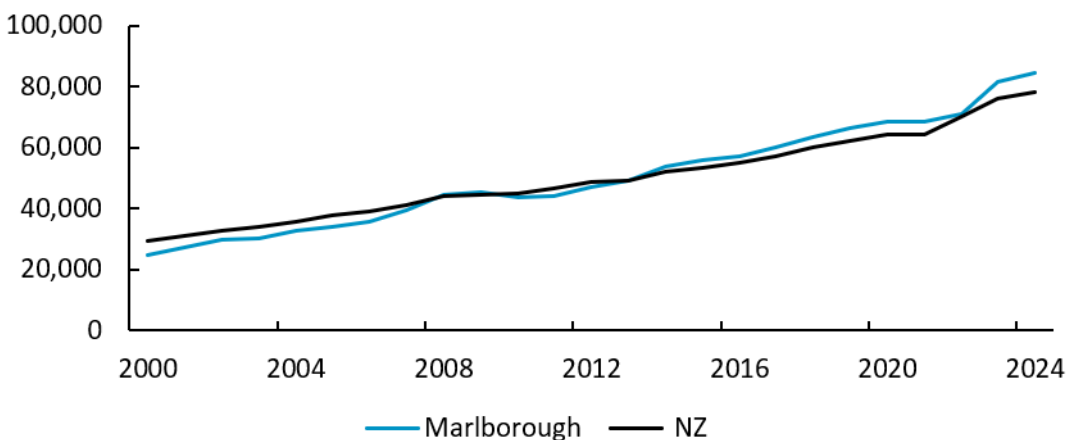
Year to March 2024

|                                                 | Marlborough | New Zealand |
|-------------------------------------------------|-------------|-------------|
| GDP per capita                                  | \$84,288    | \$78,233    |
| Ratio of regional to national GDP per capita    | 1.08        | 1.00        |
| Nominal compound annual growth rate (2000–2024) | 5.22%       | 4.16%       |

Source: Ministry of Business, Innovation and Employment

Marlborough's economic performance has strengthened considerably over the past two decades. GDP per capita has increased more rapidly than the national average, reflecting the region's comparative advantage in high-value primary production and export industries. Since 2014, Marlborough's GDP per capita has consistently exceeded the national average (Figure 4).

**Figure 4 GDP per capita in Marlborough and New Zealand**

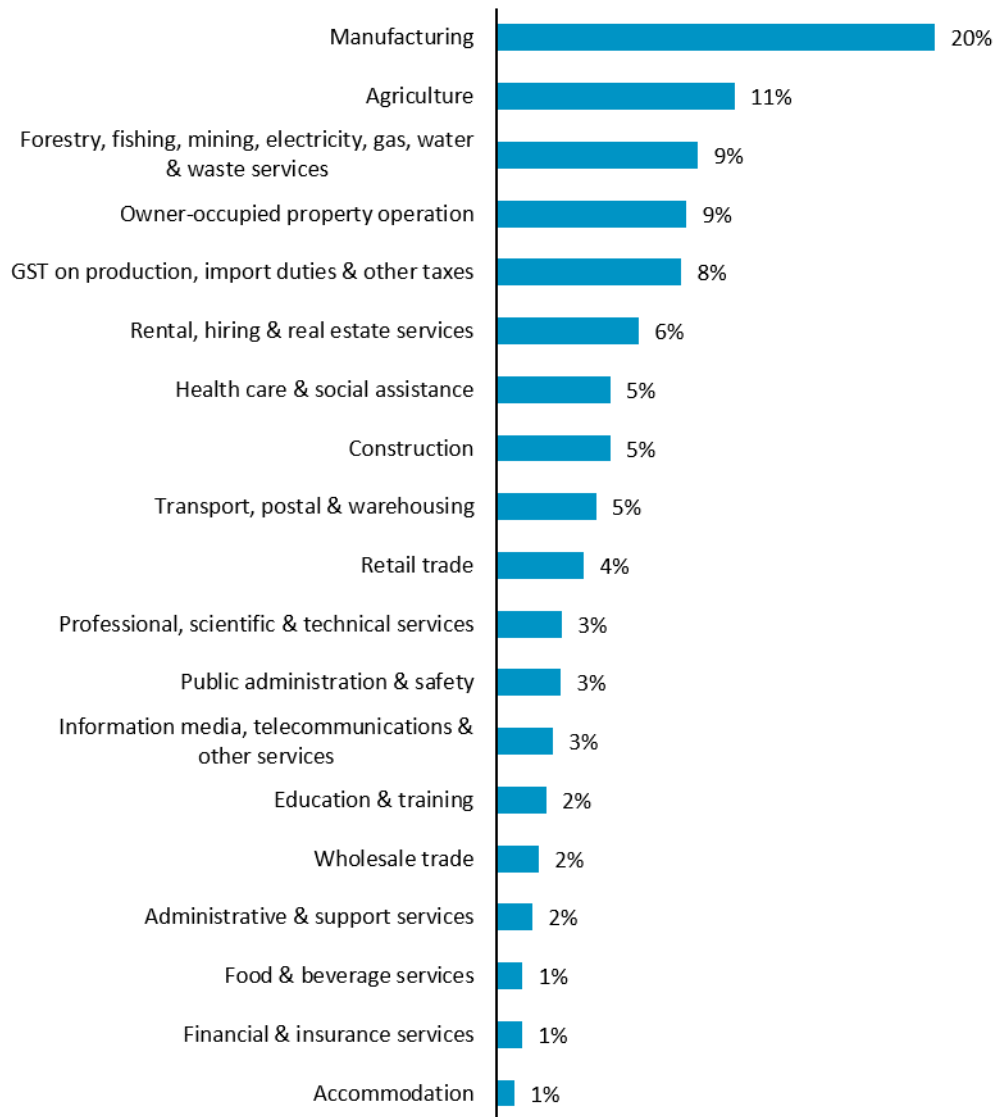


Source: Ministry of Business, Innovation and Employment

Manufacturing is the largest industry in the region, contributing approximately 20 percent of regional GDP (Figure 5). Agriculture contributes around 11 percent, while the combined forestry, fishing, mining and utilities sector contributes a further 9 percent. Together, these industries account for approximately 40 percent of Marlborough's economy and encompass much of the activity associated with viticulture, winemaking, aquaculture, seafood processing and other primary-sector supply chains (Ministry of Business, Innovation, and Employment 2025). The agriculture industry, particularly viticulture, is subject to significant seasonal variation, resulting in fluctuations in its contribution to GDP. The sector is currently experiencing a downturn; however, this is not yet reflected in the figures presented below.



**Figure 5 Contribution to Marlborough GDP by broad industry**



Source: Ministry of Business, Innovation and Employment.

The industry structure is particularly relevant to the proposed developments. Expanding aquaculture not only increases production on marine farms but also supports processing, transport and other export-oriented industries that form part of Marlborough's broader economy.

### **3.2 The role of aquaculture in Marlborough**

Aquaculture is one of Marlborough's defining industries. The sheltered waters of the Marlborough Sounds have supported commercial marine farming since the late 1960s (Dawber 2004), allowing the region to become the centre of New Zealand's Greenshell™ mussel and salmon industries while also supporting a small amount of Pacific oyster production.

The industry's economic contribution extends well beyond marine farming itself. Production is supported by an established regional cluster comprising nurseries, marine



farms, harvesting, seafood processing, engineering, vessel operations, transport, cold storage, environmental management and export services. The concentration of producers, processors and specialist suppliers has also encouraged investment in marine infrastructure, technical capability and processing capacity, which would be difficult to replicate elsewhere.

This concentration is important when assessing the proposed developments. Additional production can utilise potentially underemployed existing infrastructure, specialised skills and established processing capacity, while strengthening the commercial base that supports those industries. Consequently, any changes in aquaculture production generate economic activity well beyond the marine farms themselves through supply-chain linkages across the regional economy. These interactions are explicitly captured in our CGE modelling.

### **3.2.1 Industry production constraints**

One of the principal constraints facing New Zealand's Greenshell™ mussel industry is access to reliable mussel spat. The industry remains heavily reliant on naturally occurring wild spat, the availability of which varies considerably from year to year. Poor spatfall seasons, such as those experienced in 2022/23, can reduce mussel production for several years. While hatchery technologies offer a promising long-term solution, current hatchery capacity remains insufficient to meet industry demand. These challenges are compounded by evidence that the natural abundance of mussel larvae is declining in many parts of New Zealand, although the underlying causes remain uncertain.

## **3.3 Employment and labour-market conditions**

Aquaculture supports employment across farming, harvesting and processing, as well as through the wider regional supply chain. We estimate that approximately 346 people are employed directly in aquaculture farming within Marlborough, based on national aquaculture workforce estimates (New Zealand Institute of Economic Research 2023) and Marlborough's share of national production (Aquaculture New Zealand 2020). This represents around 1.2 percent of Marlborough's labour force and excludes employment in seafood processing and supporting industries. Therefore, we can assume total employment supported by aquaculture is substantially larger than direct farm employment alone.

The proposed developments will increase demand for labour during both construction and ongoing operation. The ability of the regional labour market to accommodate this additional demand is an important consideration when interpreting the modelling results.

Marlborough's population has grown steadily over the past two decades, although growth has slowed in recent years. Marlborough also has a relatively older age profile than the wider New Zealand population. At the same time, labour underutilisation remains below the national average (Ministry of Business, Innovation, and Employment 2025) and unemployment consistently above it (Infometrics, n.d.), indicating comparatively limited spare capacity in the regional labour market.

These conditions suggest that future industry expansion is unlikely to rely solely on unemployed workers already living in Marlborough. Instead, additional labour demand may be met through a combination of labour reallocation across industries, inward migration, increased labour-force participation, workforce training and productivity improvements.

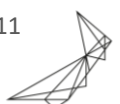


National earnings data also indicate that aquaculture supports a range of occupations with varying skill requirements. Average earnings in aquaculture farming are substantially higher than in seafood processing, reflecting differences in occupational mix, qualifications and employment arrangements. The proposed developments therefore have the potential to influence regional household incomes through both direct and indirect employment.

### 3.4 Implications for the economic assessment

Several characteristics of Marlborough's economy are particularly relevant to the assessment of the proposed developments.

- Marlborough already has a well-established aquaculture cluster with specialised infrastructure, processing capability and supporting industries. As a result, increases in aquaculture production are expected to generate economic impacts beyond marine farming through strong supply-chain linkages.
- The proposed developments expand various components of the aquaculture production system. The nursery developments increase the supply of seed mussels, the crop developments provide additional grow-out capacity, and the flat oyster development broadens the region's aquaculture base. Collectively, the projects increase the productive capacity and resilience of Marlborough's aquaculture sector.
- Marlborough's relatively tight labour market means that additional employment generated by the developments may be accommodated through labour reallocation, migration and productivity improvements rather than through reductions in unemployment alone. These economy-wide adjustments are explicitly represented within the CGE modelling presented in the following chapters.



## 4 Method and scenarios

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The economic impacts of the proposed developments were estimated using NZIER's regional CGE model, TERM-NZ. CGE models are widely used internationally to assess the economy-wide effects of investment projects and policy changes because they capture not only the direct impacts on the affected industry but also indirect effects that flow through supply chains, labour markets and trade. TERM-NZ is based on the 2020 Statistics New Zealand input-output tables and represents the relationships between industries, households, government and international trade across the New Zealand economy.

For this assessment, the model was configured to represent Marlborough, Nelson/Tasman and the rest of New Zealand. The proposed aquaculture developments were incorporated into the model using project-specific information on production, exports, capital investment and other operating characteristics. The model then estimates how businesses, households and markets adjust to these changes, producing new economy-wide estimates of output, employment, wages, trade and GDP.

Like all CGE models, TERM-NZ requires assumptions about how the economy adjusts over time, including the behaviour of labour markets, capital investment and government expenditure.

Appendix B outlines the CGE modelling methodology used in this assessment, including the TERM-NZ model, its underlying assumptions, and the approach used to represent the proposed developments within the model.

Appendix C sets out the economic data, assumptions and calculations used to develop the CGE model inputs. It explains how project information supplied by ADL was translated into production, export, capital and labour shocks consistent with the TERM-NZ database.

### 4.1 Scenario development

The proposed developments generate economic impacts during two distinct phases of the project lifecycle:

- **Construction phase** – the one-off economic impacts associated with establishing the six developments, represented by project capital expenditure (CAPEX).
- **Operational phase** – the ongoing annual economic impacts once all developments are fully operational and producing at their expected long-run capacity.

Although the six developments are expected to be commissioned over several years, the modelling aggregates them into a single investment programme. Using a comparative statics approach in the CGE model, the analysis compares the economy before the investment (the baseline) with the economy after all six developments are fully operational. The intervening years are calculated as partial development along a linear pathway to full operation. This approach estimates the long-run economic contribution of the overall programme rather than the timing of individual developments.



#### **4.1.1 Stage one: construction of the farms and nurseries**

The construction phase captures the temporary economic impacts associated with establishing the proposed marine farms and their supporting infrastructure. In the CGE model, these impacts are represented as an increase in investment expenditure allocated to the industries supplying the capital goods and services required to construct the developments.

#### **4.1.2 Stage two: increased mussel production in the region**

The operational phase estimates the ongoing annual economic impacts once the developments are fully operational. The main scenario modelled is an increase in production in Marlborough, and in national exports.



## 5 Key assumptions

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### 5.1 Economic assumptions used in the assessment

The modelling results presented in this report depend on several assumptions where the project documentation does not specify a single outcome. These assumptions ensure that the proposed developments can be represented consistently within the CGE model. The detailed calculations underpinning these assumptions are presented in Appendix C, while the principal assumptions are summarised below.

#### 5.1.1 Regional allocation of production

The project documentation indicates that nursery-grown seed may be supplied to both existing and future farms in Marlborough or elsewhere in New Zealand. Similarly, harvested shellfish may be processed and exported from various locations depending on commercial arrangements. While these uncertainties do not affect the estimated increase in national production, they do influence where economic activity occurs.

#### 5.1.2 Avoiding double counting

The production supported by the nursery developments is assumed to represent the additional harvest enabled by increased nursery capacity. Production reported separately for the Richmond Bay and Okuri Bay crop developments is treated as additional harvest beyond that enabled by the nursery developments, ensuring production is not counted more than once within the modelling.

#### 5.1.3 Scope of the economic assessment

The assessment quantifies market impacts that can be captured in the CGE model, including changes in output, exports, employment, labour income and investment. Broader benefits identified in the application material, such as improved security of seed supply, increased production resilience, greater flexibility for future industry expansion and wider environmental outcomes, are discussed qualitatively but are not assigned monetary values within the economic modelling.



## 6 Results

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### 6.1 Results by key economic metric

The results of the economic modelling are summarised in Table 4. They show that the proposed developments generate positive economic impacts during both the construction and operational phases, although the largest and most enduring effects arise once the developments are fully operational.

They show that the total GDP impact over 30 years is an increase of \$865 million for the Marlborough region. This result is based on the annual impact on the economy estimated using the TERM-NZ model, scaled according to the uptake timings described in section 2.4, and discounted at 8 percent according to Treasury guidelines (The Treasury 2024, 2015).

At full operation, the modelled scenario increases Marlborough's real GDP by approximately 1.89 percent. This represents a material increase in economic activity relative to the size of the regional economy. The increase reflects not only the additional value generated by mussel and oyster farming, but also the expansion of seafood processing and activity in supporting industries, including transport, construction, professional services and other business services.

Households in Marlborough receive a substantial share of the economic gains. Real household spending increases by approximately 1.63 percent at full operation, equivalent to an annual increase of approximately \$40 million. Over the 30-year assessment period, the present value of the increase in household spending is estimated at approximately \$409 million.

The increase in household spending reflects higher employment, real wages and labour income across the region. The Marlborough average real wage increases by approximately 0.8 percent. Benefits are not limited to Marlborough, with the Nelson Tasman area also seeing growth in real GDP and average real wages (0.63 percent and 0.39 percent, respectively).

National GDP also increases. The GDP results demonstrate the value of a regionally-disaggregated CGE model. The national impact from construction is smaller than the regional impact, suggesting that the Marlborough activity is pulling resources from other regions. The national impact from operations is larger than the regional impacts, however. The aquaculture in Marlborough spills over into greater economic activity along the value chain in other regions, increasing the benefit of the Fast-track proposal. The operational phase increases national GDP by an estimated \$125.7 million annually and \$1,279 million over 30 years. National government revenue also increases under the modelling assumptions. Real government revenue is assumed to move in line with household consumption, keeping government as a broadly constant share of economic activity. Total national government revenue increases annually by \$73 million as a result of the operational phase, equating to \$740 million over the 30-year assessment period.



**Table 4 CGE modelling results of increased production in the Marlborough region**

Total value is net present value over 30 years, with an 8 percent discount rate, in 2026 dollars.

| Economic metric                        | Phase        | Annual impact<br>\$m | Total value<br>\$m |
|----------------------------------------|--------------|----------------------|--------------------|
| GDP, Marlborough                       | Construction | 7.2                  | 6.4                |
| GDP, Marlborough                       | Operation    | 84.4                 | 858.6              |
| <b>GDP, Marlborough</b>                | <b>Total</b> |                      | <b>865.0</b>       |
| Household spending, Marlborough        | Construction | 5.2                  | 4.6                |
| Household spending, Marlborough        | Operation    | 39.8                 | 404.4              |
| <b>Household spending, Marlborough</b> | <b>Total</b> |                      | <b>409.0</b>       |
| GDP, National                          | Construction | 4.2                  | 3.7                |
| GDP, National                          | Operation    | 125.7                | 1,279.1            |
| <b>GDP, National</b>                   | <b>Total</b> |                      | <b>1,282.8</b>     |
| Government revenue, national           | Construction | 3.6                  | 3.2                |
| Government revenue, national           | Operation    | 72.7                 | 739.6              |
| <b>Government revenue, national</b>    | <b>Total</b> |                      | <b>742.8</b>       |

Source: NZIER

## 6.2 Employment impacts

The increase in economic activity is accompanied by higher employment in Marlborough. The employment results have been calculated by applying the modelled percentage change in regional employment to the 27,927 filled jobs recorded in Marlborough in 2025.

The operational employment estimate includes the net increase in jobs across the Marlborough economy. It is not limited to employment directly associated with operating the marine farms. Additional employment is generated in seafood processing, transport, construction, professional and technical services and industries supplying goods and services to households.

This estimate therefore differs from the direct full-time equivalent estimates provided in the application material as the TERM-NZ result measures the overall change in regional employment after accounting for supply-chain effects and the movement of resources between industries.

Aggregate employment across New Zealand is held fixed under the long-run modelling assumptions. The increase in Marlborough employment therefore represents a reallocation of employment towards Marlborough rather than an equivalent increase in total national employment. Additional labour demand may be met by workers moving between industries or regions, inward migration, increased labour-force participation and changes in regional population over time.

The estimated employment impacts are:



- The construction phase is estimated to support an additional 29 filled jobs during the four-year establishment period.
- At full operation, employment increases in Marlborough by 0.79 percent, equivalent to approximately 222 additional filled jobs.

The modelling also indicates that the projects improve the quality and remuneration of employment within Marlborough. The average real wage increases by 0.84 percent.

### 6.3 Summary of modelling results

The modelling assesses the economic effects of the proposed developments using three principal measures: GDP, household spending and government revenue. Employment and wage impacts provide additional information on how the increase in economic activity is distributed within the Marlborough economy.

Across the modelled phases and scenarios, the proposed developments generate positive economic outcomes for Marlborough. The construction phase provides a temporary boost in activity as the farms and associated infrastructure are established. The operational phase delivers a larger and more enduring impact through increased shellfish production, processing and exports.

Overall:

- Marlborough real GDP increases by 1.89 percent.
- Real household spending increases by 1.63 percent.
- Regional employment increases by 0.79 percent, equivalent to around 222 filled jobs.
- The average real wage increases by approximately 0.79 percent.

The economic impacts extend beyond the aquaculture industry. Increased mussel and oyster production supports additional seafood processing and creates demand for transport, construction, business services and other inputs. Higher regional employment and wages also increase demand for consumer-facing industries.

The modelling indicates a positive spillover effect for Nelson-Tasman, reflecting shared labour markets, processing capability and marine-service supply chains. Small reductions in activity occur in some other industries and regions as nationally constrained labour and capital move towards the expanding activities. These offsets mean that the results represent net economy-wide changes rather than gross expenditure effects.

Overall, the modelling indicates that the six aquaculture developments would generate a material and sustained increase in Marlborough's economic activity if the expected increases in production and exports are achieved. The results provide strong evidence that the projects would deliver significant regional economic benefits under the assumptions used in this assessment.



## 7 Wider impacts

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The proposed marine farming developments are expected to deliver significant economic benefits through increased shellfish production, improved resilience of mussel seed supply, higher exports, and additional regional employment. These impacts are assessed through the CGE modelling presented in this report.

Beyond these market impacts, the available documentation identifies a range of environmental and wider societal effects. While these effects may be economically important, they require both robust biophysical evidence and additional valuation research before monetary values can be assigned.

The available evidence indicates that the proposed developments are likely to generate several positive environmental outcomes, including:

- removal of land-derived nutrients (i.e., excess nitrogen) through mussel filter feeding (Robertson Environmental 2026)
- creation of additional marine habitat that supports biodiversity (Robertson Environmental 2026)
- continued support for local conservation and community initiatives associated with the marine farming sector (Aquaculture Direct Limited 2026).

Application documents conclude that many potential adverse effects are expected to be no more than minor and appropriately managed (Robertson Environmental 2026). Water column impacts are assessed as negligible; no significant adverse effects on indigenous biodiversity have been identified; public access and navigation are maintained; and the proposals recognise Treaty settlement obligations and Māori interests.

The principal environmental uncertainties relate to visual landscape effects in some locations and whether marine farms affect Dusky dolphin presence and behaviour in Admiralty Bay. Potential effects on marine mammals were evaluated and can be managed through dedicated Marine Mammal Management Plans (MMMP) (SLR Consulting 2026). However, available evidence does not provide sufficient quantitative information to estimate the likelihood or economic value of these impacts. Consequently, they cannot be robustly incorporated into a monetary cost-benefit assessment.

We have reviewed the landscape assessment evidence provided as part of the Application. Our understanding of the conclusions reached in the assessments is that the impacts at each site either do not materially change the landscape amenity values or are appropriate to the site. On that basis, we do not believe that economic valuation of the impacts is warranted. The specific assessments we relied on for each site are as follows:

- Onapua Bay: the proposal *'would not compromise the key landscape or natural character values'* (Narrative Landscape 2026c).
- Hapūkū Rock: the proposal can be accommodated *'without compromising the identified landscape and natural character values of the receiving environment.'* (Narrative Landscape 2026a).
- Okuri Bay: *'the proposed marine farm can be accommodated within Okuri Bay without compromising the identified landscape and natural character values of the receiving environment'* (Narrative Landscape 2026b).



- Guards Bay: the proposal *‘would not materially compromise the key landscape characteristics, the visual amenity of the wider receiving environment, or the broader values’* (Isthmus 2026a).
- Papatua Bay: *‘mussel nursery farm would result in localised landscape, visual and natural character change’* and *‘would not materially compromise the key landscape characteristics, the visual amenity of the wider receiving environment’* (Isthmus 2026b).

Overall, the evidence suggests that the Application provides significant economic benefits alongside a range of additional environmental and community effects that we have not valued in monetary terms. For some potential adverse effects, including landscape and natural character effects, the technical assessments conclude that the Application can be accommodated without materially compromising the relevant values. For other environmental effects, additional biophysical data would be required for reliable non-market valuation. Accordingly, our economic assessment captures the measurable market impacts while recognising, but not monetising, the broader environmental effects identified in the Application.



## 8 Conclusion

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This report has assessed the likely economic impacts of the Marlborough Fast-track Aquaculture Projects using NZIER's regional computable general equilibrium model, TERM-NZ.

The six developments have been assessed as a coordinated investment programme that expands complementary components of Marlborough's aquaculture production system. The nursery developments increase the availability and reliability of mussel seed, the crop developments expand harvest capacity, and the flat oyster development introduces an additional commercial shellfish species. Collectively, these investments strengthen the productive capacity and resilience of the regional aquaculture industry.

The modelling indicates that the proposed developments are expected to generate positive economic outcomes in both the construction and operational phases. Construction activity provides a temporary stimulus through additional investment expenditure, while the operational phase delivers ongoing increases in production, exports, employment and household income. Across the operational scenario, Marlborough GDP is estimated to increase by **\$865 million over 30 years**, with corresponding increases in household spending, government revenue and regional employment.

The assessment also recognises that several important benefits cannot be fully captured in a CGE model. Improved seed security, increased industry resilience, greater use of hatchery technology, enhanced utilisation of regional infrastructure and broader environmental outcomes are all identified in the application material but have not been assigned monetary values. Consequently, the quantified results presented in this report are likely to understate the total economic value generated by the proposed developments.

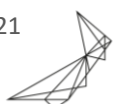
Overall, the proposed developments are expected to provide significant and enduring economic benefits. Subject to the assumptions outlined in this report, the modelling indicates that the projects will increase regional economic activity, support employment, strengthen export capability and enhance the long-term productive capacity of Marlborough's aquaculture sector. These findings are consistent with the purpose of the Fast-track Approvals Act, which aims to facilitate projects that deliver significant regional and national benefits.



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## Appendix A Economic assessment under the Fast-track Approvals Act

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### A.1 Economic assessment under the Fast-track Approvals Act

The purpose of the Fast-track Approvals Act 2024 (FTAA) is to facilitate infrastructure and development projects that provide significant regional or national benefits. Section 3 of the FTAA establishes this purpose, while Clause 17 of Schedule 5 requires decision panels to give greatest weight to the purpose of the Act and to have regard to the relevant provisions of the Resource Management Act 1991 (RMA).

Neither the FTAA nor the RMA prescribes a specific methodology for assessing economic effects or defines what constitutes a "significant" regional or national benefit. Consequently, economic assessments must apply established economic principles to evaluate the contribution of a project to economic wellbeing while recognising the broader environmental, social and cultural matters that decision panels are also required to consider.

Recent Fast-track Approvals Panel decisions (Sunfield Expert Panel 2026; Waihi North Project Expert Panel 2025; Delmore Expert Panel 2026) have also clarified that significance should be assessed in relation to the scale and importance of a project's contribution, rather than whether it 'will produce game-changing effects' (Waihi North Project Expert Panel 2025). Accordingly, this assessment considers both the magnitude of the economic impacts generated by the proposed developments and their contribution to the wider regional and national economy.

### A.2 Measurement of economic effects

Economics provides a framework for assessing how scarce resources are allocated to improve people's wellbeing. While many economic impacts are reflected through markets as changes in production, employment, incomes and exports, other impacts arise through changes to environmental quality, public goods and other non-market outcomes.

Market impacts can generally be quantified using economic data and modelling techniques. By contrast, many environmental, cultural and social effects cannot be reliably expressed in monetary terms because they relate to non-market values. These effects are nevertheless important for decision-making and are typically assessed using qualitative evidence or specialist technical assessments.

Accordingly, this report distinguishes between market impacts that can be quantified using economic modelling and broader effects that are discussed qualitatively. This approach recognises that economic wellbeing depends not only on market activity but also on the quality of environmental and community outcomes that support long-term prosperity.

### A.3 Methods of economic assessment

Several analytical approaches can be used to assess the economic effects of development proposals. The choice of method depends on the scale of the project and the questions being addressed.



Economic impact analysis estimates how a project affects measures such as production, value added, employment and household income. It captures the direct effects of project expenditure, together with the indirect effects on suppliers and the induced effects generated as workers and businesses spend additional income across the economy.

Economic impact analysis is commonly undertaken using either economic multipliers or CGE modelling.

Economic multipliers estimate how activity in one industry flows through to other industries using input-output tables that describe transactions between sectors of the economy. They provide a straightforward measure of direct impacts as well as follow-on and consumption impacts. However, they assume that production technologies and prices remain unchanged, and that there are no limits to the resources available. As a result, multiplier analysis can overstate impacts where a project is large enough to compete for scarce labour, capital or other resources, unless explicitly managed through the use of assumptions or additional analysis.

CGE modelling allows prices, wages, capital and labour to adjust in response to changing economic conditions. This enables the model to capture both the positive effects of new investment and the offsetting effects arising from competition for scarce resources. Consequently, CGE modelling generally provides a more realistic assessment of the economy-wide impacts of projects with potentially significant regional or national effects.

An alternative approach is cost-benefit analysis (CBA), which assesses whether the total benefits of a project exceed its total costs over time. Unlike economic impact analysis, CBA seeks to measure changes in overall economic welfare by considering both market impacts and, where possible, non-market effects such as environmental, social and health outcomes.

Neither the FTAA nor the RMA requires a particular method of economic assessment, and recent Fast-track Approvals Panel decisions have confirmed that quantified cost-benefit analysis is not mandatory. Consistent with long-standing practice under the RMA, environmental, cultural and social effects may be assessed qualitatively where robust monetary valuation is not available.

For the Marlborough Fast-track Aquaculture Projects, CGE modelling provides the most appropriate analytical framework because the proposed developments are expected to influence production, exports, employment and investment across multiple industries and regions. Broader environmental, cultural and social effects are considered separately using the supporting technical evidence accompanying the application.



## Appendix B CGE Modelling Methodology

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This appendix provides a more detailed explanation of CGE modelling.

### B.1 Introduction

This section describes the CGE modelling used to estimate the economic impact of the Marlborough Fast-track Aquaculture Projects and the results of that modelling. The sections are as follows:

- The methodological basis behind the CGE model
- How we represent New Zealand's regions and industries
- How we interact with the model
- The scenarios modelled
- What are the inputs for these scenarios
- Results of the modelling for the local and national economy.

### B.2 What is CGE?

#### B.2.1 CGE is standard for macroeconomic modelling

CGE modelling is a quantitative method used to analyse the complex interconnections within an economy. Our modelling tool for this project is TERM-NZ, a regionally disaggregated CGE model of the New Zealand economy maintained by NZIER, with support from the Centre of Policy Studies at Victoria University in Melbourne.

#### B.2.2 CGE models are a map of the economy

A CGE model consists of equations which describe model variables. It also uses detailed data on the structure of the economy that is consistent with these model equations.

This data provides a snapshot of the economy in a particular year, which is used as a starting point for a baseline (or BAU) against which to compare policy simulations or economic changes.

The model data are linked by a set of equations that capture how the economy evolves over time in response to a shock. These equations, grounded in the economic theory of general equilibrium, ensure that supply and demand for goods, services, and factors of production are balanced and determine how firms and households respond to changes in incentives.

In any CGE model, we must decide which variables we hold constant and which ones we allow to vary. The former are exogenous variables, considered to be determined outside the model, and the latter are endogenous or determined by the model. A CGE model is a way of explaining the endogenous variables in terms of the exogenous variables.

Where we draw the line between endogenous and exogenous variables, and which can vary or must remain fixed, depends on a number of factors, including the purpose for which the model simulations are intended. The choice that we make is called the model closure.

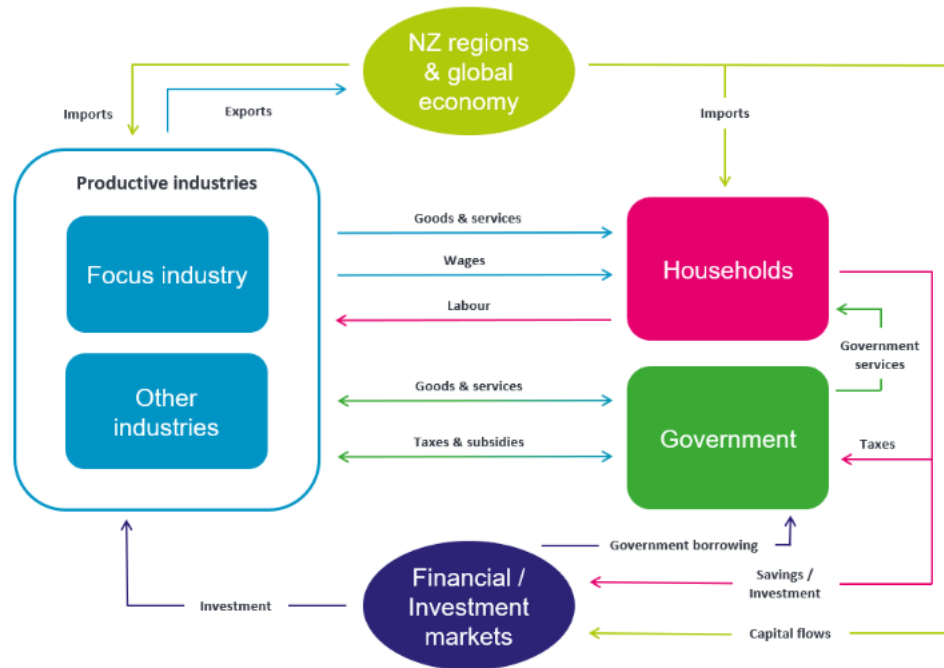


Determining the closure is a key part of any modelling exercise, and the modeller must be transparent about the modelling result and the assumptions imposed via the closure.

The difference between the initial and the new equilibrium can then be analysed to determine the effect of the shock on a range of economic indicators, such as GDP, employment, wages and living standards.

Figure 6 provides a stylistic representation of the relationships between different parts of the model.

**Figure 6 Our CGE model represents the circular flows in the economy**



Source: NZIER

### B.2.3 TERM-NZ: NZIER's CGE model

TERM-NZ is a CGE model designed by the Centre of Policy Studies (CoPS) at Victoria University in Melbourne, Australia. CoPS based TERM-NZ on the Stats NZ 2020 input-output (IO) tables (Stats NZ 2021). CGE models are data-driven and used to capture the effects of new policies, technologies, or other external shocks on economic activity. They capture the economy-wide effects of changes ('shocks' in modelling jargon) directly on the affected industry and indirectly on supplying industries, competing industries, and factor markets (labour and capital). CGE models show the full effect of a change, which includes impacts from indirect effects that aren't immediately obvious. The cumulative impact of indirect effects can outweigh the direct effect of a change.

CGE models also estimate the effect of a shock on macroeconomic variables such as GDP, employment, wages and trade.

CGE models are a powerful tool, enabling economists to empirically explore many issues that would be intractable using econometrics or multiplier analysis. For these reasons, CGE models have become widely used internationally (e.g. by the OECD, IMF, and World Bank) for economic impact analysis.



## B.3 Modelling the impact of the Marlborough Fast-track Aquaculture Projects

### B.3.1 Sectors and regions in the model

Table 5 below lists the industries captured in TERM-NZ as organised for assessing the Marlborough Fast-track Aquaculture Projects. They are calculated in line with the broad ANZSIC (Australia New Zealand Standard Industrial Classification) divisions and are broken down where relevant. For regional analysis, we capture Marlborough, Nelson/Tasman and the aggregated remaining area of New Zealand.

**Table 5 Industries captured in the model**

| Industries                                             | Industries (cont)                               |
|--------------------------------------------------------|-------------------------------------------------|
| Retail trade                                           | Wood manufacturing                              |
| Wholesale trade                                        | Other manufacturing                             |
| Vegetables and plants                                  | Electricity, gas, water, and sewerage           |
| Horticulture                                           | Construction                                    |
| Cereals and forage                                     | Accommodation and food services                 |
| Sheep and beef                                         | Transport, Postal and Warehousing               |
| Other Livestock                                        | Information Media and Telecommunications        |
| Dairy Cattle                                           | Financial and Insurance Services                |
| Other Animal Production                                | Rental, Hiring and Real Estate Services         |
| Seafood                                                | Owner Dwellings                                 |
| Crustaceans (category includes mussels and oysters)    | Professional, Scientific and Technical Services |
| Agricultural, forestry, and fisheries support services | Administrative and Support Services             |
| Mining                                                 | Public Administration and Safety                |
| Meat processing                                        | Education and Training                          |
| Seafood processing                                     | Health Care and Social Assistance               |
| Dairy processing                                       | Arts and Recreation Services                    |
| Other food manufacturing                               | Other Services                                  |
| Clothing, textiles and fabrics                         | Travel                                          |

Source: NZIER

### B.3.2 What are our key economic assumptions?

CGE models require researchers to make a few assumptions about how the economy operates, which are the closure conditions discussed above. Essentially, there are too many variables for the amount of economic data available, so we must narrow down a few of those variables to allow the model to find a solution. We narrow down those assumptions using macroeconomic theory about how the economy operates. These assumptions are called *closure conditions*. They typically concern labour markets, capital markets, government behaviour, and foreign exchange.

We investigated several sets of closure conditions to select one that allowed the model to reflect medium-term adjustments in the economy: sufficient flexibility to represent the



choices and changes that businesses and consumers might make, while imposing constraints on their options.

The closure conditions used for this modelling are the following:

- Aggregate employment is fixed, but the real wage varies, so changes in the macroeconomy have an impact on the average household.
- Capital is available, but the rate of return is fixed, which provides investment capital for changes in business activities as long as the changes are sufficiently profitable.
- Real government consumption is proportional to household consumption, so that government spending is constant as a percentage of the whole economy.

#### **B.4 How do we shock the model?**

To produce different scenario outcomes, we must ‘shock’ the model by changing inputs to generate changes in national and regional economies. When we shock the model, we select specific input parameters and change their values. The change in some input parameter values produces further changes throughout the economy. Resources are reallocated to reflect changing conditions. These changes result in increases or decreases in the industries represented in the model, leading to corresponding fluctuations in the commodities produced. There are flow-on effects on markets and supply chains. The model tries to find a mathematical solution that shows how the economy would resettle into a steady state given the new input parameter value(s). We can then examine the changes by industry and region or at the national level. We can also compare changes across scenarios to identify how the economy responds to different shocks.

There are several ways to shock the model, as it has many input parameters. We have shocked the productivity of economic resources and inputs, and then allowed the model to reallocate consumption and production in response to prices and market drivers.

Across the scenarios, we adjusted input parameters in various ways to simulate possible futures, as described with the help of partners and advisors. The next section describes the scenarios and how they were developed.



## Appendix C Economic data and assumptions

### C.1 Purpose

This appendix documents the project-specific data, assumptions and calculations used to develop the inputs for the CGE modelling presented in this report. Its purpose is to provide transparency around how information supplied by ADL was interpreted and translated into the economic assumptions and model inputs required for NZIER's TERM-NZ model.

Unless otherwise stated, project information is sourced from ADL. Monetary values supplied in 2026 dollars have been converted to year-ended March 2020 dollars using the Consumer Price Index (CPI) published by the Reserve Bank of New Zealand to ensure consistency with the TERM-NZ database.

### C.2 Project information

The modelling is based on information supplied by ADL for each of the six proposed developments. This includes estimates of:

- capital expenditure (CAPEX)
- production supported
- production value
- export value

Table 6 summarises the project information used to develop the model inputs.

**Table 6 FTA production data**

In 2026 dollars

| Site         | CAPEX<br>(\$ million) | Production<br>Supported<br>(GWT) | Production value<br>supported<br>(\$ million) | Annual potential<br>export revenue<br>(\$ million) |
|--------------|-----------------------|----------------------------------|-----------------------------------------------|----------------------------------------------------|
| Papatua      | 3.30                  | 20,570                           | 33.94                                         | 122.42                                             |
| Guards       | 3.23                  | 14,331                           | 23.65                                         | 85.29                                              |
| Hapuku       | 1.23                  | 7,914                            | 13.06                                         | 47.10                                              |
| Okuri        | 0.88                  | 1,095                            | 1.81                                          | 6.52                                               |
| Richmond     | 1.28                  | 1,613                            | 2.66                                          | 9.60                                               |
| Onapua       | 1.24                  | 115                              | 1.22                                          | 4.40                                               |
| <b>Total</b> | <b>11.15</b>          | <b>45,638</b>                    | <b>76.33</b>                                  | <b>275.32</b>                                      |

Source: ADL, NZIER

### C.3 Data interpretation and modelling assumptions

The information supplied by ADL requires several interpretation and conversion steps before it can be represented within the CGE model. These assumptions provide a consistent basis for translating the biological production system into economic model inputs.



### C.3.1 How products are defined

Data in the CGE model are taken from Stats NZ's input-output (IO) tables and therefore follow Stats NZ's commodity naming conventions. The commodity labelled "Crustaceans" corresponds to NA06CC 042.00, "Other aquatic plants and animals". Despite the abbreviated "Crustaceans" label used in the IO tables, this is a broader commodity grouping that encompasses several Central Product Classification (CPC) products, as shown in the table below. In particular, it includes CPC 4291, "Other molluscs, live, fresh or chilled", which includes mussels. It also includes CPC 4220, "Oysters".

**Table 7 Product classification**

| CPC  | Description                                                                                       |
|------|---------------------------------------------------------------------------------------------------|
| 4210 | Crustaceans, not frozen                                                                           |
| 4220 | <b>Oysters</b>                                                                                    |
| 4291 | <b>Other molluscs, live, fresh or chilled</b>                                                     |
|      | scallops, <i>Pecten</i>                                                                           |
|      | mussels, species of <i>Mytilus</i> and <i>Perna</i>                                               |
|      | cuttlefish, <i>Sepia officinalis</i> , <i>Rossia macrosoma</i> , species of <i>Sepiola</i>        |
|      | squid, species of <i>Ommastrephes</i> , <i>Loligo</i> , <i>Nototodarus</i> or <i>Sepioteuthis</i> |
|      | octopus, species of <i>Octopus</i>                                                                |
|      | snails, species of <i>Gastropoda</i>                                                              |
|      | clams and other molluscs                                                                          |
| 4299 | Other aquatic invertebrates, live, fresh or chilled                                               |
| 4910 | Coral and similar products, shells of molluscs, crustaceans or echinoderms and cuttle-bone        |
| 4920 | Natural sponges of aquatic animal origin                                                          |
| 4930 | Seaweeds and other algae, fresh, frozen or dried, whether or not ground                           |

Note: The indented rows are products included within CPC 4291 rather than separate CPC categories. Mussels of the genus *Perna* include New Zealand green-lipped mussels (*Perna canaliculus*).

Source: Statistics New Zealand

### C.3.2 Production supported

For the three mussel nursery developments, the reported production supported is interpreted as the long-run annual harvestable Greenshell™ mussel production enabled by the additional nursery capacity. It is not interpreted as the value of seed produced within the nursery itself. This interpretation is consistent with the production pathway described in Section 2, where nursery developments increase the supply of seed mussels that are subsequently grown to harvest size on crop farms.

### C.3.3 Production values

The reported wharf price for half shell of approximately \$1,650 per GWT is interpreted as the value of harvested mussels at the point of harvest, prior to processing. This value is applied to the eventual harvest enabled by the nursery developments.



For flat oysters, no equivalent wharf price value was available. An indicative value was therefore estimated by applying the observed relationship between mussel wharf price values and export values. Oyster production reported in dozens was converted to green weight tonnes using an estimated conversion factor of 0.8 kilograms per dozen (thinkstep Ltd 2021).

#### C.3.4 Price Basis

The TERM-NZ database is calibrated to the New Zealand economy in the year ended March 2020. To maintain consistency with the model database, all monetary values supplied by ADL were converted from 2026 dollars to 2020 dollars using CPI deflators.

### C.4 Development of model inputs

The project information described above was converted into the economic inputs required for the TERM-NZ model. The modelling scenarios are driven by two primary changes:

- an increase in crustacean output within Marlborough
- an increase in national export demand reflecting the additional production.

Additional project information relating to labour requirements and capital investment was reviewed to support interpretation of the results but was not directly introduced as model shocks.

#### C.4.1 Output

The estimated increase in annual harvestable production was converted into an increase in the value of output for the Marlborough crustaceans sector using the estimated wharf price production values described above. This increase was then expressed as a percentage change relative quantity to the existing value of crustacean output in the TERM-NZ database and applied as an output shock. The resulting increase represents approximately 42 percent of existing crustacean production in the TERM-NZ database.

#### C.4.2 Exports

The increase in export value was allocated between processed seafood exports and unprocessed crustacean exports using historical export shares derived from Stats NZ trade data for the year ended March 2020 (Stats NZ 2026). This reflects the fact that the majority of New Zealand Greenshell™ mussels are exported in processed form. The resulting export values were then expressed relative to existing exports in the TERM-NZ database to determine the export shocks.

**Table 8 Export percentage in processed vs unprocessed**

| Mussel form                        | % exports (value) |
|------------------------------------|-------------------|
| Unprocessed (crustaceans sector)   | 2.06%             |
| Processed (Fish processing sector) | 97.94%            |

Source: Stats NZ



## C.5 Summary of model inputs

Table 9 summarises the final shock magnitudes applied within the TERM-NZ model following the interpretation and conversion steps described above.

**Table 9 Shock magnitudes applied across different scenarios**

In \$ millions, in 2020 dollars.

| Area        | Metric                      | Base value | Increase in value | New value | Percent change |
|-------------|-----------------------------|------------|-------------------|-----------|----------------|
| Marlborough | Output of crustaceans       | 140.99     | 59.16             | 200.15    | 42.5%          |
| National    | Export value crustaceans    | 325.71     | 4.46              | 330.17    | 1.4%           |
| National    | Export value processed fish | 1,393.76   | 1,605.62          | 211.85    | 15.2%          |

Note: Base value is taken from the CGE database.

Source: NZIER



## Appendix D Wider economic impacts

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The discussion of the economic assessment framework in Appendix A noted that some environmental effects may be assigned monetary values where robust biophysical evidence and appropriate valuation methods are available. In practice, non-market valuation depends on first identifying and quantifying the environmental changes attributable to a project.

This appendix outlines the principal approaches available to valuing non-market environmental effects before considering, in section D.2, the available biophysical evidence relating to the proposed marine farming developments and the extent to which those effects could be valued.

### D.1 Non-market valuation of marine environment effects

Many of the environmental effects associated with aquaculture developments are not traded in markets and therefore do not have observable prices. Estimating their economic value requires three sequential steps:

- identifying the environmental effects attributable to the project
- quantifying the magnitude and timing of those effects
- assigning monetary values that can be incorporated into an economic assessment.

The first two steps rely primarily on ecological and biophysical evidence. Economic valuation is only possible once the nature and magnitude of environmental changes have been established with sufficient confidence.

#### D.1.1 Types of ecosystem services

Environmental effects can be classified using the ecosystem services framework (Millennium Ecosystem Assessment 2005), which groups environmental benefits into four broad categories:

- **Provisioning services** – goods produced by ecosystems that are directly consumed or traded, such as seafood, freshwater and timber.
- **Regulating services** – ecosystem functions that reduce environmental risks or provide natural regulation, including water filtration, erosion control and nutrient cycling.
- **Cultural services** – recreational, aesthetic, heritage and cultural values associated with the natural environment.
- **Supporting services** – fundamental ecological processes, such as nutrient cycling and habitat provision, that underpin other ecosystem services. These are generally not valued separately to avoid double counting.

Provisioning services often have observable market values, while regulating and cultural services generally require non-market valuation techniques.

#### D.1.2 Components of economic value

Non-market valuation commonly applies the **Total Economic Value (TEV)** framework, which recognises that environmental assets provide value in several different ways:



- **Direct use value** – benefits from current use of the resource.
- **Option value** – the value of retaining opportunities for future use.
- **Quasi-option value** – the value of preserving future opportunities where scientific uncertainty exists, until future information may reduce that uncertainty.
- **Bequest value** – the value of preserving environmental assets for future generations.
- **Existence value** – the value people place on the continued existence of species or ecosystems regardless of whether they ever directly use them.

Together, these values capture many of the benefits that are not reflected in market transactions.

### D.1.3 Valuation methods

Several approaches are available for assigning monetary values to non-market environmental effects.

- **Market valuation** uses observed market prices where ecosystem services produce marketable goods or services, such as commercial fisheries or tourism.
- **Cost-based approaches** estimate the value of ecosystem services by measuring costs avoided or replacement costs, for example the flood protection or water treatment services provided by natural ecosystems.
- **Revealed preference methods** infer environmental values from observed behaviour, such as differences in property prices associated with environmental amenity.
- **Stated preference methods** estimate willingness to pay for environmental improvements through carefully designed surveys.
- **Benefit transfer** applies valuation estimates from previous studies undertaken in comparable locations where primary valuation is not practical.

Each method has strengths and limitations, and the most appropriate approach depends on the type of environmental effect, the available data and the purpose of the assessment.

### D.1.4 Application to this assessment

For the proposed aquaculture developments, a reliable monetary valuation would require robust evidence on the magnitude, duration and spatial extent of any environmental changes attributable to the projects. Although the supporting technical reports identify a range of potential environmental benefits and adverse effects, the available information is insufficient to support a robust non-market valuation.

Primary non-market valuation studies are resource-intensive and often difficult to justify within statutory consent processes. Benefit transfer offers a lower-cost alternative, but it requires valuation estimates from sufficiently similar locations and environmental contexts. Comparable New Zealand studies remain limited, and existing databases, including Treasury's CBAX, contain relatively few values applicable to marine aquaculture.

Accordingly, this assessment presents quantified estimates of market impacts using CGE modelling while qualitatively considering broader environmental effects. If future biophysical evidence or location-specific valuation studies become available, these effects could be incorporated into a more comprehensive cost-benefit assessment.



## D.2 Environmental effects of the proposed marine farm developments

The proposed developments are intended to increase the resilience and productive capacity of Marlborough's aquaculture industry while supporting future industry growth. In recent years, Greenshell™ mussel production in the Marlborough Sounds has fluctuated at around 60,000 green-weight tonnes (GWT), with warmer water temperatures in the inner Sounds contributing to increased mussel mortality. The proposed developments seek to address these constraints by expanding nursery capacity in cooler Outer Sounds locations, diversifying production areas and introducing commercial flat oyster farming (Aquaculture Direct Limited 2025a).

At full operation, the proposed developments are expected to support between 24,713 and 98,438 GWT of additional annual mussel production, generate between \$76 million and \$579 million in indicative export revenue, and support between 126 and 954 full-time equivalent jobs. In addition to increasing production within Marlborough, the nursery developments are expected to improve the reliability of mussel seed supply nationally by reducing reliance on spat collected from Te Hiku o te Ika / Te Oneroa-a-Tōhe (Aquaculture Direct Limited 2025b).

### Environmental benefits

Beyond the economic value of production, the Application documents also identify a range of environmental effects associated with mussel farming, implying incremental gains from further expansion of mussel farming. These include:

- Nutrient mitigation by mussels filter-feeding on land-derived nutrients, removing approximately 50% of excess nitrogen entering coastal waters from local rivers
- Habitat creation, as mussel farms create complex three-dimensional habitat in the water column and on the seabed, increasing biodiversity
- Support for native species of marine life, by increasing habitat offering food and roosting sites for seabird, fish and marine mammal populations.

### Findings from the supporting technical assessments

Referral documents also allude to some other external beneficial effects for local communities arising from mussel farming. These include:

- Annual beach cleaning initiatives to counter the perception of mussel farming as a source of marine debris and with the aim to be a net remover of plastic waste from beaches: in 2024, of 4,454kg collected, 38 percent was attributable to aquaculture, the remaining 62 percent to a mix of household, vehicle and farming waste.
- The Havelock Mussel and Seafood Festival event, established in 2004 and providing an annual aquaculture-focused drawcard for tourism to the Marlborough Sounds.
- The King Shag collaborative multi-year initiative to research and better protect the New Zealand King Shag, a nationally endangered seabird endemic to Marlborough (Aquaculture Direct Limited 2025a, 37).

These examples establish positive effects of aquaculture in addition to current measured economic gains.



Papers filed with the application as referral documents include an assessment of the proposal against the NZ Coastal Policy Statement ('Marlborough Sounds Aquaculture Combined Comments', n.d.). This found:

- The proposals provide critically important mussel nursery space, adding productivity and resilience across the industry and opportunity for industry growth and diversity into high-value flat oyster farming;
- No adverse effects on significant indigenous biological diversity and no significant adverse effects on other indigenous biodiversity;
- Negligible effects on water quality;
- Adverse visual impacts where farms overlap areas of high or outstanding natural character or landscape, but contained by unobtrusive farm design and appropriate to the existing modified land character;
- The application acknowledges Treaty of Waitangi principles, allows for exercise of Māori customary interests and guardianship, and at the Richmond Bay site recognises statutory settlement obligations and involvement of tangata whenua in resource opportunities; and
- Farm design retains public access and navigation, maintaining recreational and fishing values (Aquaculture Direct Limited 2025b, 32).

### Previous evidence of impacts of mussel aquaculture

NIWA (2019) reviewed and collated information concerning the provision of ecosystem services provided by mussel aquaculture with respect to the Marlborough Sounds' State of Environment report. Without collecting new empirical data but using available published literature, NIWA reviewed reports on mussel farming in the area, compliance reports provided by MFA, and grey literature from internet searches.

As filter feeders, shellfish remove excess nutrients from coastal waters and mussel farms capture suspended sediment, but NIWA found their effect on individual bays suspended sediment is small. Around 6 kilograms of Nitrogen are removed per tonne of harvested green-weight mussels, with 266 tonnes N removed from Pelorus Sound alone (and about 360 tonnes from all Marlborough waters). Around 150 tonnes wet weight of *Undaria* that colonises mussel farms are currently removed per year, equivalent to approximately 5 tonnes of N removed. *Undaria* removal is expected to double in future years.

NIWA also found that overall species diversity appeared marginally higher, with a greater abundance of these species associated with mussel-culture-derived reefs. Mussel farming's main ecosystem service is provisioning of raw material and medicinal resources for human wellbeing, principally mussel meat, but also increasingly nutraceutical products (powder and mussel oil) for the treatment of inflammatory diseases and general health benefits.

NIWA's review did not fully quantify the ecosystem services of mussel farming and notes that more research will be needed before all key services can be quantified and incorporated into a knowledge-based approach to evidence of marine farming's effects.

### Other potential impacts

The Referral Application documents include collected comments from affected agencies, including Marlborough District Council, Minister of Finance, Minister of Oceans and Fisheries, Ministry for Primary Industries, Aquaculture New Zealand, the Department of



Conservation (DOC) and Maritime New Zealand ('Marlborough Sounds Aquaculture Combined Comments', n.d.). Of these, DOC expressed most concern about potential adverse environmental effects of the proposed new marine farms, citing a Variation to the Marlborough Environmental Plan under consideration that would consider enclosed waters of the Marlborough Sounds are already at capacity of aquaculture in terms of its effects on indigenous biodiversity, landscape, natural character, recreation, amenity and navigation.

The Referral Application documents contain no information on the potential impacts of new marine farms on recreation and tourism, other than a rather dated 2011 report on potential impacts of an outer sounds salmon farm proposal (Bamford and Young 2011). That report found that the "effects on recreation and tourism at the specific sites ranged from negligible to more than minor but were not significant". The latter conclusion rested on most sites being classed as accessible on DOC's recreational opportunities spectrum, a condition in which recreational visitors should expect to see other visitors and modification of the natural environment (such as jetties, wharves and marine farms). Also influencing the conclusion was the location of sites in parts of the Queen Charlotte Sound and Pelorus Sound that have lower recreational and tourism use. The report noted that marine farms may themselves provide opportunities for industrial tourism, such as boat cruises to working farms and on-water produce tastings. The 2011 report did not quantify existing recreational use of water space around the actual sites and relied largely on consultation interviews with various stakeholders.

The location of the current mussel farm proposals in the outer Sounds, away from the main tourist sites around Queen Charlotte Sound and Tennyson Inlet, suggests that a recreation and tourism assessment of the current proposals would reach similar conclusions. Maritime New Zealand, in its comments in the Referral Documents cited above, found no cause for concern with the current proposals regarding either navigation around the farm sites or with the safety of appropriately licensed vessels used in servicing the farms. We understand that the Ministry for Primary Industries will undertake an Undue Adverse Effects Test, which is applied to assess whether consents under the RMA encroach on productive fishing grounds that affect the value of fishing quota held for a fishery management area, as part of the Panel process. However, the 2011 recreation report is dated and lacks details of current uses of the specific sites, which could now be more discoverable with use of modern technologies such as AIS vessel tracking and Strava data on personal exercise locations.

### **D.3 What is the non-market value of this project's environmental effects?**

The CGE modelling estimates the effects of the proposed developments on measured economic activity, including output, GDP, employment and household consumption. These are market impacts, arising from goods, services and production that are traded in markets.

However, projects can also generate environmental and social effects that are not reflected in market prices. These non-market effects may either add to or reduce the overall economic value of a project but are not captured in the CGE modelling.

Some environmental effects can still be valued using market information. For example, if a marine farm displaces commercial or recreational fishing from productive fishing grounds, the resulting loss of catch or additional travel and fishing costs can be estimated using observed market prices and operating costs.



Other effects do not have observable market prices. Changes in environment, recreational amenity, biodiversity, or risks to protected species may still represent real gains or losses in wellbeing, but estimating their economic value requires non-market valuation techniques.

Table 10 summarises the broad economic, environmental and social effects identified in the referral documentation. The first two benefits are incorporated into the CGE model through changes in production, investment and operating activity. The remaining environmental effects fall outside the scope of the CGE model and would require separate non-market valuation to estimate their monetary value.

Ecological effects identified in the Application documents are predominantly beneficial, although we are mindful of the possibility of two potential adverse effects: impacts on landscape and amenity values, and risks to marine mammals. The Application documents conclude that potential adverse ecological effects are no more than minor. While the environmental benefits are well described qualitatively, they are generally not quantified in physical terms. Without estimates of the magnitude of these effects, a robust non-market valuation is not possible.

**Table 10 Broad costs and benefits of new marine farms in Marlborough**

| Benefits                             | Costs                            |
|--------------------------------------|----------------------------------|
| Increased shellfish production       | Establishment & operating costs  |
| Increased reliability of spat supply | Potential risk to marine mammals |
| Nutrient removal from seawater       | Changes to landscape & amenity   |
| Net removal of marine rubbish        |                                  |
| Habitat creation & biodiversity gain |                                  |
| Low carbon industry                  |                                  |

Source: NZIER

In addition to market and environmental effects, the proposed developments are expected to generate wider social and regional benefits. A Ministry for Primary Industries report notes that employment created through aquaculture can improve household incomes, reduce poverty, improve health outcomes, strengthen social connections, and contribute to people's sense of identity and wellbeing (Baines and Quigley 2014). Aquaculture also creates demand for specialised skills, encouraging workforce development and attracting skilled workers to regional communities. These broader benefits are associated with stronger regional economies and improved community wellbeing, although they are not directly quantified in this assessment.

