The economic contribution of commercial fishing

Fisheries Inshore New Zealand (FINZ) report

March 2022

Making sense of the numbers

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Fishing Industry Value

THE FISHING INDUSTRY CREATES VALUE FROM CATCHING AND PROCESSING.

FISH EXPORTS ARE ABOUT 3% OF ALL NEW ZEALAND EXPORTS

Economic Contribution

FISH SOLD AND PROCESSED CREATES PROFITS FOR BUSINESSES, JOBS FOR NEW ZEALANDERS AND INCOMES FOR HOUSEHOLDS.

	OUTPUT ($M)	GDP ($M)	EMPLOYMENT (FTES)
FISHING INDUSTRY	2,698	1,096	11,560
SEAFOOD PROCESSING	3,555	1,536	10,630
FISHING AND SEAFOOD PROCESSING COMBINED	5,166	2,186	16,530

Making sense of the numbers

Commercial fishing plays a significant part in the New Zealand economy. This report, prepared for the Fisheries Inshore New Zealand (FINZ), concludes that in 2020, commercial fishing provided:

- Direct output value of $2.3 billion and total output value of $5.2 billion
- Direct economic contribution of $818 million and a total economic contribution of $2.2 billion, representing 0.7 percent of New Zealand Gross Domestic Product (GDP)
- Direct employment of 6,314 Full Time Equivalents (FTEs) and total employment of 16,522 FTEs, representing 0.7 percent of New Zealand employment[1]
- Exports of $1.8 billion, being New Zealand's seventh largest export commodity by value and representing three percent of total exports.

Commercial fishing comprises both Fishing activities and Seafood Processing activities. The Fishing industry provides raw products for processing, and relies on the Seafood Processing industry to purchase its harvest. The Fishing industry and the Seafood Processing industry are strongly connected, and a number of New Zealand companies operate in both. Consequently, important synergies exist in their fishing, processing and marketing. The valuations account for this overlap.

The commercial Fishing industry valuations in this report are given in terms of economic contributions:

- For fishing sectors: Deepwater, Inshore, Highly Migratory, Rock Lobster and Shellfish
- For Australian New Zealand Standard Industry Classification 2006 (ANZSIC06) industries based on fishing gear: Trawling, Netting and Seining, Line fishing, Rock Lobster and Crab potting, and Other fishing
- For Fishing Management Areas (FMAs)
- For the Fishing industry and the Seafood Processing industry, separately and combined
- Derived from catch data supplied by the Ministry for Primary Industries (MPI)
- Derived using New Zealand input-output table multipliers
- Using Statistics New Zealand employment data and fishing industry revenue totals
- For "capture" fishing and so excludes the contribution of the Aquaculture industry.

In the five years to 2020, on average:

- Deepwater fishing had an output value of $2.7 billion, GDP of $1.1 billion and employment of 8,462 FTEs
- Inshore finfishing had an output of $1.3 billion, GDP of $533 million and employment of 4,158 FTEs
- Highly Migratory Species (HMS) had an output of $126 million, GDP of $53 million and employment of 466 FTEs

[1] Employment numbers have increased, in comparison to the 2017 report, as a direct result of chartered vessels which are registered as New Zealand vessels, now required to register foreign crew members as New Zealand employees, when previously they did not need to register these crew members, and therefore these crew members were omitted from the count of employees.

- Rock Lobster harvesting had an output of $629 million, GDP of $266 million and employment of 1,965 FTEs
- Shellfish harvesting had an output of $444 million, GDP of $187 million and employment of 1,471 FTEs.

For the Deepwater fishery Hoki was the top commercial fish species in terms of overall value, followed by Ling and Arrow Squid. These species accounted for the bulk of the value of the Deepwater fishery. In particular, Hoki accounted for 44 percent of value for Deepwater fisheries and 29 percent of the total commercial fishing value.

For the Inshore fisheries (Finfish, Rock Lobster and Shellfish), the largest economic contributions came from Finfish with 25 percent of the total fishing value, followed by Rock Lobster with 12 percent, and Shellfish with nine percent. Within the Finfish industry the top value species were Snapper, followed by Jack Mackerel and Tarakihi. In particular, Snapper accounted for seven percent of Inshore Finfish fish and 18 percent of total fishing value.

Meanwhile the Trawling, Seining and Netting (ANZSIC06) industry was the most significant contributor to value, providing around 64 percent of the total value to the combined Fishing and Seafood Processing industry.

Across the FMAs, Challenger (FMA7) had the largest average catch value, at $195.1 million over the five years to 2020, followed by Southland (FMA5, with $150.1 million) and South East Coast (FMA3, with $144.5 million). Overall an average catch value of $284.3 million was unable to be linked to an FMA.

Contents

Figures

Tables

1 Introduction

Fisheries Inshore New Zealand (FINZ) commissioned Business and Economic Research Limited (BERL) to provide an economics based estimate of the value of commercial fishing to the New Zealand economy. This report is an update from BERL's 2017 report, which estimated the economic contribution of commercial fishing in New Zealand in 2015.[2]

The purpose of this report is to inform fisheries management decisions by providing a strong evidence base of the performance of commercial fishing over the course of a five year period (2016 – 2020).

Within this report, estimates of catch value and economic contribution are provided by segments of the commercial Fishing industry, for example by:

- Sectors – Deepwater, HMS, Inshore, Rock Lobster and Shellfish
- Geographic location
- Methods of catch
- Species
- Employment.

BERL have used the catch data held by the Ministry for Primary Industries (MPI) to provide those sector estimates.

Defining economic contribution

In this report, "economic contribution" is defined as the gross change in a nation's economy that can be attributed to a given industry.[3] Economic contributions occur from transactions in a market setting. Commercial fishing refers to commercial (profit-oriented businesses) fishing for the capture of (non-farmed) marine (non-freshwater) fish species. The economic contribution of the commercial Fishing industry is set in both a historical and a global context.[4]

Key components of this report, and the 2017 report, include:

- Estimates of direct output for the fishing sector are specifically designed to cover capture fishing and to exclude aquaculture
- Use of five year average catch and value data, which is adjusted to reconcile with Annual Enterprise Survey (AES) data
- Use of the 2013 Input-Output tables produced by Statistics New Zealand.[5]

[2] Seafood New Zealand. (2017). *The Economic Contribution of Commercial Fishing to the New Zealand Economy.* Retrieved from; https://www.seafoodnewzealand.org.nz/fileadmin/documents/media_releases/BERL/BERL_Report_August_2017.pdf

[3] The change is measured in terms of output, value added, and employment.

[4] A more detailed breakdown of economic contribution is defined and illustrated in Appendix B.

[5] BERL has updated the 2013 Input-Output tables produced by Statistics New Zealand to 2019.

2 Overview

2.1 Fisheries management in New Zealand

Legislation and management of New Zealand fisheries

New Zealand's fisheries resources in the Territorial Sea (TS), and the wider Exclusive Economic Zone (EEZ), are managed under the Fisheries Act 1996 and the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. The Fisheries Act 1996 embodies the concepts of sustainable utilisation of our fisheries resources, and ensuring the long-term viability and bio-diversity of the aquatic environment. Environmental considerations are also managed under other acts such as the Wildlife Act 1953, the Marine Mammals Protection Act 1978, the Marine Reserves Act 1971 and the Resource Management Act 1991.

However, the main environmental impacts are managed under the Fisheries Act 1996. This enables fisheries resources to be utilised in a way which ensures sustainability and the future availability of resources for future generations.

The Quota Management System

The Quota Management System (QMS) sets the harvest levels of fish species within the EEZ and the TS. The main provisions of the QMS are to:

- Maintain fisheries at a sustainable level through the Total Allowable Catch (TAC)
- Allocate that TAC to sectors
- Allocate the commercial allocation to commercial stakeholders
- Provide economic incentives and enable rational industry participation
- Enable quota to be tradable and leasable
- Track catch against quota via a government monitoring system, and allow quota owners to catch their entitlement.

New Zealand currently has 97 fish species, or groups of species, subject to the QMS. Each species has separate Quota Management Areas (QMA) that are based on biological boundaries. The species are managed as 637 separate fish stocks. A stock is a species within a QMA.

Through the QMS, the Minister for Fisheries sets the annual total allowable catch (TAC) and total allowable commercial catches (TACCs) within this area. The TAC is the total quantity of fishing-related mortality allowed for a QMS stock in a given fishing year. Effectively, the TACs for fish stocks are set so that enough fish remain for breeding at a sustainable level for the future. According to MPI, 131 of the 159 assessed fish stocks in 2020 are at a healthy status, with 28 fish stocks currently assessed as overfished. From the TAC, an allowance is made to provide for recreational fishing and customary uses before the TACC is set. The TACC is the total quantity of each fish stock that the commercial Fishing industry can catch for that year. Once the TACC is set, the fishing rights are distributed as Annual Catch Entitlement (ACE) to quota owners, proportional to their quota shareholdings in that stock. Quota is a right in perpetuity to a share of the available TACC. Both quota and ACE can be traded.

Some components of the QMS are reviewed annually including the TACCs, deemed values and government levies.

In addition to the species in the QMS, there are a number of other species that are managed outside the QMS. These are stocks that are perceived not to be commercial targets, or have no sustainability or utilisation concerns that would warrant their inclusion in the QMS.

The Ministry for Primary Industries (MPI) manages New Zealand's fisheries resources, policy development and overall fisheries management, including science, monitoring and compliance roles. Strategic and operational fisheries plans are developed for each of New Zealand's fisheries. These give rise to stock assessment and aquatic environment research.

2.2 The Fishing industry

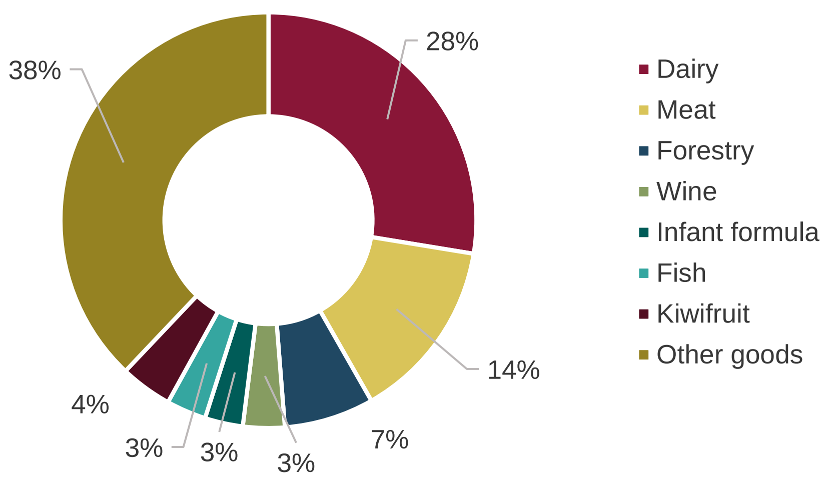
Between 2016 and 2020, the Fishing industry, on average, sustainably harvested around 410,000 tonnes of wild fish, with an estimated value of $2.83 billion to the Fishing and Seafood Processing industry. In 2020 - the latest year available – there were 282 enterprises engaged in the fish Trawling, Seining, and Netting industry, 309 enterprises in the Line Fishing industry, 315 in the Other fishing industry, and 261 in the Rock Lobster and Crab potting industry. Additionally, there were 120 enterprises engaged in the Seafood Processing industry.

The interests of the Fishing industry - including Rock Lobster, Paua, Deepwater, Aquaculture and Inshore finfish - are represented by Sector Representative Entities (SREs).[6] Fisheries Inshore New Zealand (FINZ) also represents Inshore finfish, pelagic and tuna quota owners, ACE holders, and commercial fishers. Seafood New Zealand operates as a peak body for the commercial fishing sector.

2.3 Exports

In the year ended March 2020, fish exports from New Zealand totalled $1.8 billion. Fish exports by value increased since March 2016, by $1 billion, but they have slipped down the order of New Zealand's largest export commodities from fifth to seventh. As shown in Figure 1, fish exports by value in 2020 accounted for three percent of total exports ($58.5 billion).

Figure 1: Exports, selected merchandise, year to March 2020



[6] For further information see, www.seafoodnewzealand.org.nz/industry/our-sectors/

3 Methodology

In this section BERL presents the conceptual framework of economic contribution and its components, along with the empirical methodology used to estimate the economic contribution of commercial fishing to the New Zealand economy.

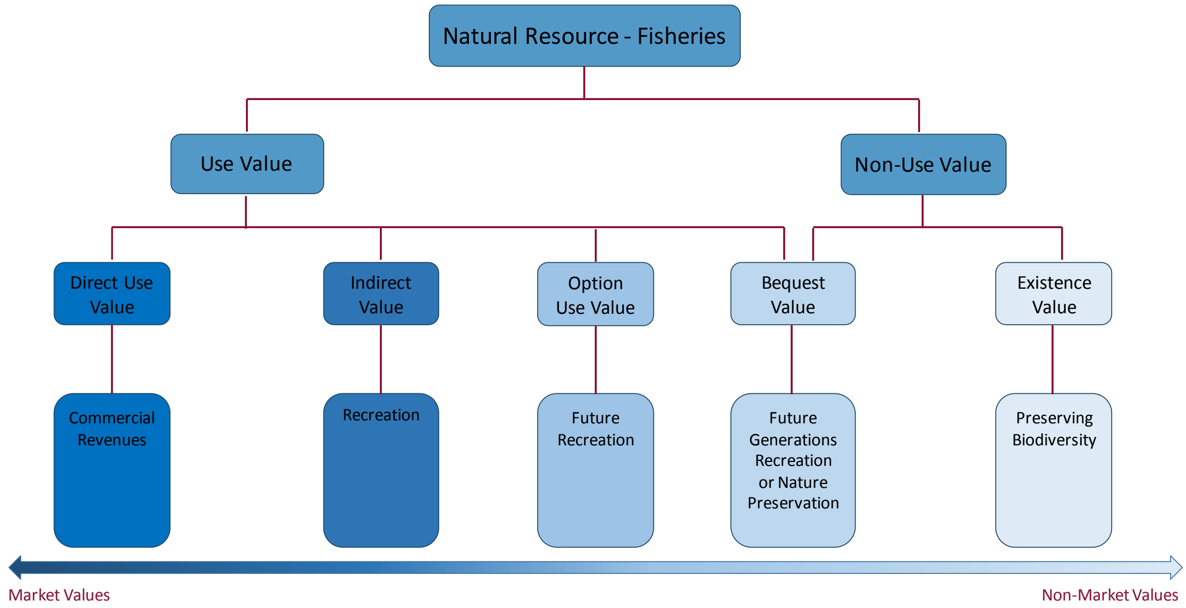
3.1 Economic contribution and economic value

In its simplest terms, economic contribution from an economic activity is the cost to the nation if the activity stops. More precisely, an economic contribution is defined as the gross changes in a nation's existing economy that can be attributed to a given industry. Economic contributions occur from transactions in a market setting.

Economic contribution is one part of a suite of contributions to the total economic value of a fishery resource. As shown in Figure 2, the total economic value of a natural resource comprises:

- Use values derived from the actual use of the resource together with other factors in production, including:
    - Direct use - actual use resulting in a marketed output
    - Indirect use - recreational use resulting in a non-marketed output
    - Option use - the right to use the resource in the future for direct or indirect uses
    - Bequest use - the conferring of a right to another to use in the future.
- Non-use values, where the values are independent of the individual's present use, including:
    - Bequest value - the conferring of a right on another to enjoy in the future
    - Existence value – the enjoyment or displeasure in the present of knowing that a resource exists.

Figure 2: Total economic value of a fisheries resource



The use value from commercial fishing can be measured with the associated market-based transactions. The economic contribution is the measure of the use value.

The non-market use value of recreational fishing is not part of the measure of its economic contribution. The non-market use value can be estimated by the willingness of recreational fishers to pay for their enjoyment. This is not easily measured and will differ for different people.

Option values are linked to potential future uses. They can change with changes in future conditions. In the present if few substitutes exist for a use, then the option value is high. In the future, if many substitutes are likely to be available, then the future option value is likely to diminish.

Bequest values can have either “use” or “non-use” values. This depends on whether the future recipient is able to “use” or simply “enjoy” the natural resource.

Existence values are personal and not objective. They can be simultaneously beneficial and detrimental to different people. Hence, changes in them can result in an increase or decrease in value to each person. For example, one person may enjoy rainfall, while another may take displeasure in it.

3.2 Components of economic contribution

Since the economic contribution of an activity is measured in a market setting, the process for its measurement is well-defined and there are a number of useful guiding principles. These include the following:

- The definition of the activity should correspond with the industry classification of an official statistics agency. This means that there is a clear link to the impact of this activity on the national accounts in terms of output, GDP, wages and employment
- The share of the activity that is directly relevant should be determined because not all industry activities are solely concerned with one type of output. For example, not all boat building is marine-based
- Multiple counting of the impact of an activity must be avoided
- Land-based processing/distribution of resources should be included, where the resource does not undergo drastic transformation. For example, seafood marketing and processing should be included.

Commercial fishing is a collection of market-based activities. These activities are set within the industries that make-up the combined Fishing and Seafood Processing industry. As noted at the beginning of this report, in this study we define the Fishing and Seafood Processing industry as consisting of five sub-industries:

- Trawling, Seining and Netting
- Line fishing
- Other fishing
- Rock Lobster and Crab potting
- Seafood Processing.

Commercial fishing generates revenues (outputs) and it has associated costs. It requires capital investment in vessels, and the wages it pays and the number of people employed are well-defined. Firms in this industry purchase goods and services and create revenue in closely associated firms, for example Shipbuilding and Repairs, and in more distantly related firms, for example in road transportation.

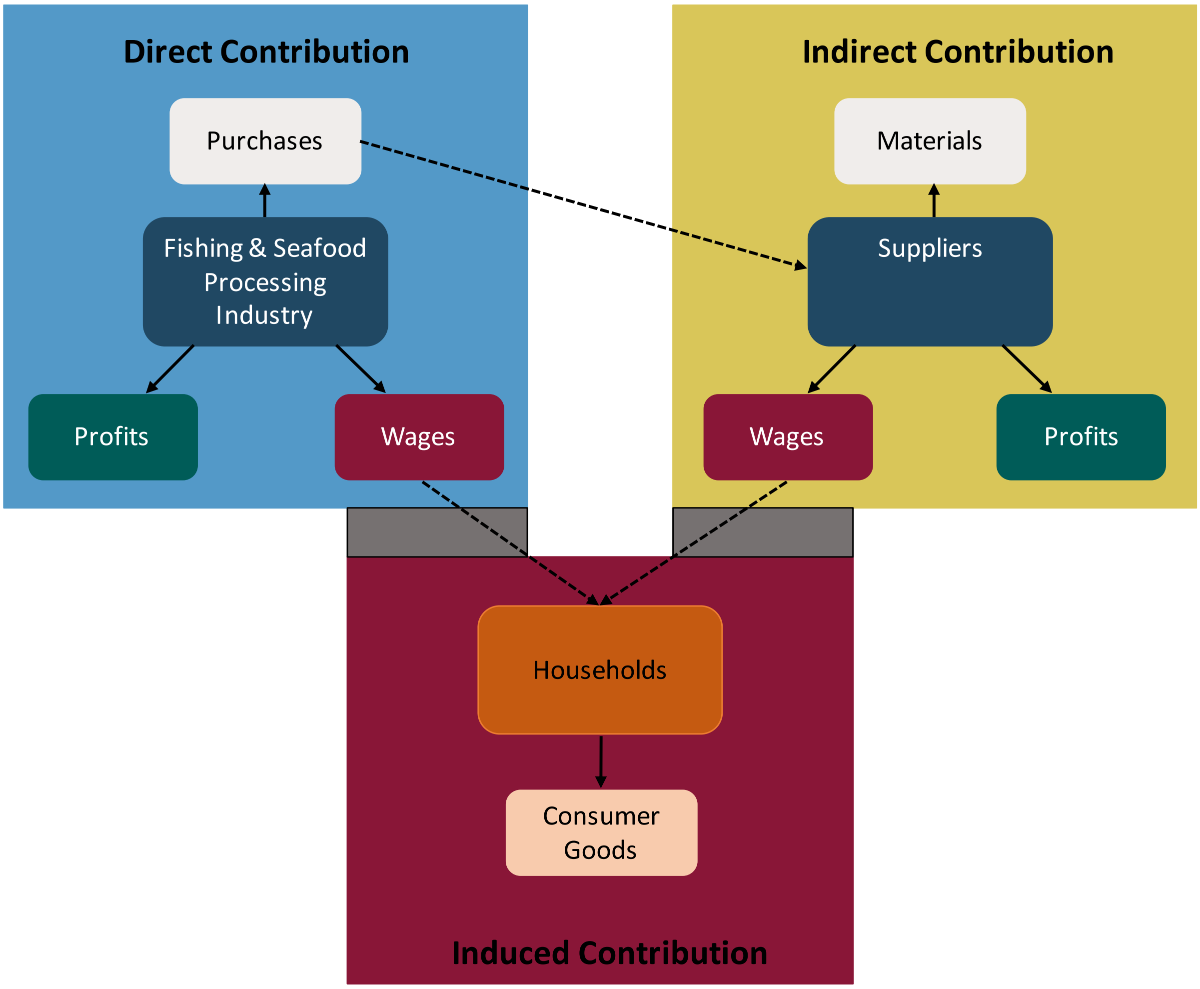
The economic contributions of the combined Fishing and Seafood Processing industry are made up by:

- Profits from commercial fishing
- Remuneration paid to fishing company employees
- Taxes paid (less subsidies)
- Depreciation of assets
- Revenue of firms supplying goods and services to commercial fishers
- Revenue created in subsequent market transactions of households whose members derived income from employment in fishing sector firms and their supplier firms.

Figure 3 shows how the direct economic contributions of the combined Fishing and Seafood Processing industry (listed above) affect other parts of the New Zealand economy. In particular the figure shows how purchases made by the industry generate income for suppliers to the industry, who then buy materials, pay staff and make profits. It also demonstrates how wages paid both directly by the combined Fishing and Seafood Processing industry, and by Suppliers, provide Households with income, which fuels their purchases of consumer goods.

For further details on the multiplier process, as well as direct, indirect, and induced effects and contributions see Appendix B.

Figure 3: Economic contribution of the Fishing and Seafood Processing industry



3.3 Measuring economic contribution

In order to calculate the economic contribution of the Fishing industry to New Zealand, BERL undertook the following steps:

1. Sourced commercial fish catch data for the 2016 to 2020 fishing years (October to September) from MPI
2. Converted unit catch data to greenweight (unprocessed) catch volumes using MPI provided conversion factors
3. Checked the annual reported fish catch in the provided data against the reported total commercial catch for 50 fish species, which represented over 90 percent of the annual catch
4. Allocated each fish stock to one of five fisheries (Inshore, Deepwater, Highly Migratory Species (HMS), Rock Lobster, and Shellfish) based on the MPI management groups
5. Allocated the fish catch to one of the four fishing industries (Trawling, Seining and Netting; Line fishing; Other fishing; Rock Lobster and Crab potting) based on the method used to catch the fish
6. Sourced 2015 to 2019 annual fish exports data from Statistics New Zealand, so that the export volume and export price per kilogram could be determined
7. Sourced 2020/2021 port prices from FINZ
8. Used export volumes, export prices per kilogram and port prices to determine the final value of the annual fish catch, and split that value across the Fishing and Seafood Processing industries. Further details of these calculations to determine the value of each fish species, and how it is split across the Fishing and Seafood Processing industries, are available in section 3.3.8 on page 10 of this report
9. Sourced Annual Enterprise Survey (AES) data for 2018, 2019 and 2020, for the four fishing industries and the Seafood Processing industry, to provide the reported total revenue for these industries
10. Adjusted the value of the fish catch to match the AES total revenue totals for the four fishing industries and the Seafood Processing industry
11. Sourced annual employee count data from Statistics New Zealand's Linked Employer-Employee Dataset (LEED), which showed the number of self-employed, and wage and salary employees, who worked in the four fishing industries, the Seafood Processing industry, and marine services industries
12. Used employment data, and average annual total value data, to calculate the economic contribution to New Zealand of the four fishing industries, the five fisheries, the overall fishing sector, and the Seafood Processing industry. In addition, BERL calculated the economic contribution for the five fisheries and the four industries when combined with their Seafood Processing industry.

More detail on each of these twelve steps is detailed next.

3.3.1 Sourcing fish catch data

In this step BERL sourced fish catch data from MPI, for the period from October 2015 to September 2020. The dataset provided by MPI had a total of 325,680 rows of data, and contained the month, species caught, FMA the fish was caught in, fishing method used to catch the fish, and greenweight in kilograms or the number of fish caught (unit number). To better enable the analysis of the data, each month was assigned to an annual fishing year, for example October 2015 to September 2016 were assigned to the 2016 fishing year.

3.3.2 Converting unit catch data to greenweight[7]

Of the 325,680 rows of data, 13,360 had unit catch data, most commonly these records were for Tuna, Shark or Shellfish species. For this data to be used alongside the greenweight (kilograms) data, this unit catch data had to be converted into kilograms. To undertake this conversion BERL used the MPI conversion factor (converting units to kilograms) for each specific fish species, which was then multiplied by the unit catch number for that fish species. In total, 30 fish species had unit catch data converted to kilograms, so that this catch could be used alongside the greenweight catch data.

3.3.3 Matching total annual catch to reported commercial annual catch

On the fisheries infosite operated by MPI, the reported commercial catch for each fish species in the QMS, is recorded for each fishing year.[8] To ensure that the catch per species per fishing year in the analysis dataset matched, BERL identified initially the top 30 species, by average annual volume of fish catch. These initial species represented around 90 percent of the annual fish catch on average.

For each of the five fishing years covered in the dataset, the reported commercial catch of the top 30 fish species was recorded and then checked against the calculated totals. Where there was a difference in the numbers, BERL adjusted the calculated totals to match the reported commercial catch for that fishing year.

In addition, once BERL had identified the value of each fish species by Fishing industry and fishery, any fish species with a significant value was added to the initial list of 30 species if they were not already included. This was to ensure that their catch volumes per fishing year matched the reported commercial catch. In total, 50 fish species had their calculated annual catch matched to MPI's reported commercial catch.

3.3.4 Allocating fish stocks to fisheries

For this research, FINZ wanted to analyse the economic contribution by fishery and industry. To that end, FINZ provided a list of fish species to BERL, detailing which of the five fisheries (Inshore, Deepwater, HMS, Rock Lobster, and Shellfish), each fish species was allocated to.[9] While almost all of the 487 fish species were allocated to a single fishery, three fish species (Jack Mackerel, Blue Mackerel, and Barracouta) were split across Deepwater and Inshore, based on which FMA the fish were caught in.

More details of each fishery, as well as their main fish species caught, are shown in Section 4.5.1 of this report.

[7] Greenweight is the unprocessed weight of the fish in kilograms
[8] Fisheries infosite (https://fs.fish.govt.nz/)
[9] This list was based on the MPI's allocation of fish stocks to their management groups.

3.3.5 Allocating fish catch to fishing industries

Within the ANZSIC06, there are four different fishing industries in New Zealand:

- Trawling, Seining and Netting
- Line fishing
- Other fishing
- Rock Lobster and Crab potting industries.

As these industries are defined and based on the method of catch, BERL has used the fishing method used to catch each fish to split the annual fish catch across these industries. In total, there were 41 different fishing methods used to commercially catch fish across the five years covered in this research. Each fishing method was assigned to one of the four industries.

Once completed, each of the 325,680 rows within the fish catch dataset was assigned to a fishery and an industry. Though it should be noted that while, for example, all Spiny Red Rock Lobster will be part of the Rock Lobster fishery, not all of the catch will be within the Rock Lobster and Crab potting industry, as small amounts of this Rock Lobster are caught using a variety of different fishing methods.

3.3.6 Sourcing fish export data

BERL sourced from Statistics New Zealand, 2015 to 2019 calendar year exports for fish at the Harmonised System level 10 (HS10), which is the most detailed level of the export classification. The export data included export volumes and values. For each export record, BERL matched the export record to a fish species. For each fish species exported across the five year period BERL determined the average export volume, and average export price per kilogram.

3.3.7 Sourcing port prices

As part of this research, FINZ provided BERL with 2020/2021 port prices for around 100 of the 487 fish species caught in New Zealand over the five year period. For all other fish species, BERL assumed a port price of $0.50 a kilogram. Overall, these 387 fish species comprise around three percent of the total annual fish catch. Port prices are calculated on an annual basis for each fish stock by MPI (who survey licensed fish receivers), and reflect the prices paid to a fisher landing fish to licensed fish receivers.

3.3.8 Determining initial value of Fishing and Seafood Processing

In this step, BERL firstly combined the average annual fish catch for each fish species with the average annual exports by fish species. To do this BERL took average annual volume of exports (in kilograms of processed fish) for each fish species, and compared it to the average annual volume of catch (in greenweight kilograms or unprocessed weight), to find the percentage share of total catch that was exported. Because the export volume is processed weight and the catch is unprocessed weight, the percentage share of exports will always be smaller than if it had been converted back to greenweight. Therefore, to account for this, BERL set the benchmark for a species to be export focussed at ten percent. For any fish species that meets this mark, BERL used the export price per kilogram multiplied by the average annual fish catch, to determine the total value for this fish species. For any fish species that did not meet this mark, BERL used 2.5 times the port price multiplied by the average annual fish catch, to determine the total value for this fish species.

To split the total value for each fish species between the Fishing industry and the Seafood Processing industry, BERL used the port prices multiplied by the average annual fish catch as the value going to the Fishing industry. Therefore, the difference between the total value and value going to the Fishing industry is the value going to the Seafood Processing industry. For example, for Hoki (which is an export focussed fish species), the export price is $5.34 a kilogram, while the port price is $0.66 a kilogram. With an average fish catch of 128,780 tonnes, the total value is around $560 million, with $166 million going to the Fishing industry, and $394 million going to the Seafood Processing industry.

3.3.9 Sourcing Annual Enterprise Survey data

Annual Enterprise Survey (AES) data is collected from businesses between 1 October in one year and 30 September the following year. For example, the AES 2020 financial year covers 1 October 2019 to 30 September 2020. As the coverage period for AES matches the fishing year, we can use annual reported total revenue for each of the four Fishing industries, as well as for Seafood Processing, to match to the overall calculated revenue totals.

As the Seafood Processing industry includes Aquaculture Processing, BERL adjusted the total revenue for Seafood Processing down by 10.5 percent, to account for the value of Aquaculture Processing. The 10.5 percent figure was calculated by determining the average share of revenue for the Aquaculture industries (Caged Offshore Aquaculture, Longline and Rack Offshore Aquaculture, and Onshore Aquaculture) when combined with the four Fishing industries over the last three years (2018, 2019 and 2020). For example, in 2020, the three Aquaculture industries had a combined revenue of $164 million, compared to the four Fishing industries which had a combined revenue of $1,331 million, which made the $164 million 11 percent of the combined $1,495 million.

3.3.10 Adjusting calculated values to match AES data

For each of the five fishing years, the total calculated Fishing industry and Seafood Processing industry values were adjusted to match the AES data for the corresponding year. This provides a consistent annual revenue or value for the four Fishing industries and the Seafood Processing industry, which can be broken down by FMA, fishery, and fish species, to provide a richer picture of the make-up of these top level industry values.

At this point BERL had a five year fish catch dataset that was consistent with total reported commercial catch, and total revenue for the Fishing industry, as well as the Seafood Processing industry.

3.3.11 Sourcing employment data

The last set of data sourced for this research was Linked Employer-Employee Data (LEED). This dataset provided regional annual employment data for each of the four fishing industries, as well as the Seafood industry, and Marine service industries. This employment data was split between self-employed and wage and salary employees.

Having regional employment count data for each industry allowed BERL to use this employment data in the multiplier analysis, rather than relying on the multiplier model to calculate employment per million dollars of revenue. In addition, this data enabled BERL to determine employment data for each fishery and FMA, for use in BERL multiplier calculations.

Similar to the AES data, BERL needed to remove from Seafood Processing the proportion of employment due to Aquaculture. To do this, BERL determined the percentage share of employment in Aquaculture as a proportion of a combined Fishing and Aquaculture industry. Using this method, it was determined that around 25 percent of Seafood Processing employment is due to Aquaculture and, therefore, this proportion was split out from the overall number of people employed in Seafood Processing. The remainder were assumed to work in processing seafood that came from the Fishing industry.

3.3.12 Determining economic contribution

In this last step, BERL used multiplier analysis (see Section 3.4), derived from Inter-Industry Input-Output tables, to estimate the total impact on GDP and employment of an initial direct impact to the economy, in terms of revenue and employment. Multipliers allow us to identify the indirect, induced, and total effects of additional activity or expenditure in terms of output, GDP and FTEs.

To undertake this analysis, BERL used the total value/revenue for the four fishing industries, the five fisheries, the overall fishing sector, and the associated Seafood Processing industry, along with employment, to determine the economic contribution of each. The economic contribution is shown in terms of direct, indirect, induced and total output, GDP and employment.

Lastly, BERL determined the economic contribution of a combined Fishing and Seafood Processing sector. To do this BERL had to use revised multipliers to account for the overlap between the Fishing and Seafood Processing industries. This is required to remove the double counting that would otherwise take place with the Seafood Processing industry purchasing a significant portion of its inputs from the Fishing industry (which is already accounted for).

3.4 Industry multipliers

BERL used 2013 Input-Output tables produced by Statistics New Zealand to generate national level multipliers for the Fishing and Aquaculture, and the Seafood Processing industries.[10]

Input-Output tables produced by Statistics New Zealand include 106 industries, which represent the total economy. This means that there is just one multiplier industry, which includes a combination of industries that covers the entire Fishing and Aquaculture catching and harvesting industries, as represented in Table 1.

Table 1: Multipliers by industry

Multiplier Industry	Indirect	Induced	Total
Fishing and aquaculture			
Output	0.87	0.22	2.10
Value added	1.24	0.38	2.62
Employment	1.28	0.37	2.65
Seafood processing			
Output	0.99	0.33	2.31
Value added	1.13	0.47	2.60
Employment	1.54	0.61	3.15

Source: Statistics New Zealand

These multipliers were used to calculate the estimates for the national economic impact of the Fishing and Seafood Processing industries separately. For the estimates of the combined economic

[10] BERL updated the 2013 Input-Output tables to 2019.

value of the joint Fishing and Seafood Processing industries, BERL created overall multipliers for each of the calculations in the report.

4 The volume and value of the commercial catch

This section of the report provides commercial catch totals and values which were used to estimate the economic contribution of commercial fishing in New Zealand.

The commercial catch values used to estimate the economic contribution of the Fishing industry are based on 2020/21 port prices and catch volumes supplied by MPI. An adjustment process of the port prices and catch volumes was undertaken to account for missing catch volume data in the detailed MPI dataset, and to reconcile the total output calculated using port prices to the gross output reported for the Fishing industry in the AES of Statistics New Zealand.

4.1 Commercial catch data

MPI supplied commercial catch volumes in kilograms (total greenweight) by year, month, species, fishing management area, statistical area fishing method. MPI also supplied 2020/21 port prices by species and fishing management area, for all target species, caught within the 200 nautical mile EEZ.

This dataset covered five fishing seasons from October 2015 to September 2020. BERL has, therefore, calculated a five year average to smooth out annual fluctuations in catch volumes.

4.2 Commercial catch volumes

As detailed in Section 3.3.3, the MPI catch data provided did not always match the reported commercial catch for a given fishing year. As a consequence of this mismatch, BERL adjusted the catch data to reconcile 50 species totals with those reported by MPI.

4.3 Commercial catch volumes by FMA

Across the ten FMAs included in New Zealand's EEZ, the average adjusted commercial fish catch between 2016 and 2020 was 406,096 tonnes, as depicted in Table 2.[11] This is a slight decrease from the average adjusted commercial catch between 2010 and 2015, which was 434,336 tonnes.

[11] A map of New Zealand's FMA's is provided in Appendix C.

Table 2: Commercial catch volume by FMA

	Total commercial catch (tonnes)					
Fishing Management Area	2016	2017	2018	2019	2020	Average
1 - Auckland East	29,396	33,327	28,803	27,434	30,092	29,810
2 - Central East	27,640	25,940	31,477	30,670	26,877	28,521
3 - South East Coast	54,368	67,565	59,712	74,399	66,453	64,500
4 - South East Chatham Rise	40,391	39,852	44,690	38,486	35,756	39,835
5 - Southland	42,451	39,504	41,448	53,366	51,283	45,610
6 - Sub-Antarctic	61,247	49,957	55,587	40,101	61,700	53,719
7 - Challenger	107,261	113,551	103,740	81,871	82,099	97,704
8 - Central West	17,535	20,721	19,575	20,355	19,240	19,485
9 - Auckland West	17,122	8,739	11,751	11,898	15,150	12,932
10 - Kermadec	2	4	10	0	0	3
Unknown FMA	17,739	22,181	17,161	12,666	135	13,976
Total	415,152	421,341	413,955	391,248	388,785	406,096

Source: MPI

The leading FMA in New Zealand was Challenger (FMA7), which had an average commercial fish catch of 97,704 tonnes between 2016 and 2020. This has decreased from an average commercial fish catch of 103,638 tonnes between 2010 and 2015.

Second to FMA7 was the South East Coast (FMA3), which had an average commercial fish catch of 64,500 tonnes between 2016 and 2020. Furthermore, the Sub-Antarctic (FMA6) had an average commercial fish catch of 53,719 tonnes.

The average commercial fish catch of all ten FMAs between 2016 and 2020 has decreased in comparison to the average commercial fish catch between 2010 and 2015. However, this decrease in average catch was made up for by an increase in average commercial catch value.

4.4 Commercial catch values by FMA

Commercial catch values were estimated using 2020/21 port prices. These values can be interpreted as a measure of revenue of the Fishing industry for the detailed segments of the dataset.

As detailed in Section 3.3.10, these values were then aggregated by the four ANZSIC06 industry groups within the Fishing industry (methods of fishing):

- Trawling, Seining, and Netting
- Line fishing
- Other fishing
- Rock Lobster and Crab potting.

The detailed values making up each aggregate value were then adjusted so that the aggregate reconciled with the corresponding values for the same industries, as reported in the AES of Statistics New Zealand.

Between 2016 and 2020, the average commercial catch value across all ten FMAs was $1.29 billion, as depicted in Table 3. This is a significant increase from an average commercial catch value of $930 million between 2010 and 2015.

Table 3: Commercial catch value (adjusted by FMA)

	Estimated value of fish ($millions)					
Fishing Management Area	2016	2017	2018	2019	2020	Average
1 - Auckland East	104.3	96.4	103.4	104.9	128.4	107.5
2 - Central East	78.9	67.6	87.7	97.5	120.7	90.5
3 - South East Coast	110.9	108.8	119.6	190.9	192.1	144.5
4 - South East Chatham Rise	97.4	84.4	110.3	127.2	155.4	114.9
5 - Southland	106.7	83.8	107.0	183.4	269.7	150.1
6 - Sub-Antarctic	127.8	86.0	120.5	99.5	130.1	112.8
7 - Challenger	192.6	180.1	193.9	185.5	223.4	195.1
8 - Central West	34.9	35.8	39.9	45.6	43.0	39.8
9 - Auckland West	52.7	34.5	43.8	46.5	62.6	48.0
10 - Kermadec	0.0	0.0	0.1	0.0	0.0	0.0
Unknown FMA	354.2	392.2	349.0	322.4	3.9	284.3
Total	1,260	1,170	1,275	1,403	1,329	1,288

Source: BERL

Along with holding the largest average commercial catch, Challenger (FMA7) also accounted for the highest average commercial catch value between 2016 and 2020 at $195 million. FMA7 was followed by Southland (FMA5) at $150 million and the South East Coast (FMA3) at $144 million.

4.5 The value of outputs from the Seafood Processing industry

Output values from the Seafood Processing industry are more likely to reflect export prices, rather than port prices. Accordingly, BERL sourced export volumes and values for all calendar years between 2015 and 2019 from Statistics New Zealand, to enable us to determine which fish species are exported and what export price per kilogram they receive. How export prices and volumes were used in calculating the value of the Seafood Processing industry is discussed in detail in Section 3.3.

4.5.1 Commercial catch and value in the Deepwater and Inshore fisheries

The Deepwater and Inshore fisheries contain a variety of fish species, and include five sectors, which are:

- Deepwater
- Inshore
- HMS
- Rock Lobster
- Shellfish.

Deepwater fishery

Between 2016 and 2020, the average commercial fish catch within the Deepwater fishery was 292,223 tonnes. As depicted in Table 4, the top commercial fish species for Deepwater fishing were:

- Hoki, with an average commercial catch value of $165.8 million
- Ling, with an average commercial catch value of $95.9 million

- Arrow Squid, with an average commercial catch value of $90.9 million.

At 128,780 tonnes, the average commercial catch of Hoki was significantly higher than other fish species in the Deepwater fishery. This was 44 percent of the total average commercial catch of the Deepwater fishery. However, Hoki only accounted for 29 percent of the total average commercial catch value of the Deepwater fishery. This reflects the lower per-unit value of Hoki compared to other species, for example Ling and Arrow Squid, despite the high-biomass of the species.

Table 4: Deepwater commercial catch and value by top species, 2016 - 2020

Fish species	Total commercial Deepwater fish catch (tonnes) average (2016 - 2020)	Estimated value of fish ($ millions) average (2016 - 2020)
Hoki	128,780	165.8
Ling	16,632	95.9
Arrow Squid	34,018	90.9
Orange Roughy	8,060	38.5
Jack Mackerel	22,368	36.0
Scampi	1,019	31.5
Southern Blue Whiting	23,212	27.6
Oreos	8,319	15.0
Silver Warehou	8,245	13.5
Alfonsino & Long-finned Beryx	2,529	11.3
Sub-total	253,182	526.1
Other fish species	39,042	43.7
Grand total	292,223	569.8

Source: MPI, BERL

Between 2016 and 2020, the top ten fish species accounted for 87 percent of the total average commercial catch of the Deepwater fishery, and 92 percent of the total average commercial catch value.

Inshore fishery

As depicted in Table 5, the total average commercial catch of the Inshore fishery between 2016 and 2020 was 96,225 tonnes, which was a decrease from 106,498 tonnes between 2010 and 2015. The estimated total average value of the Inshore fishery commercial catch was $383.5 million, with the top species being:

- Snapper, with an average commercial catch value of $70.9 million
- Jack Mackerel, with an average commercial catch value of $33.5 million
- Tarakihi, with an average commercial catch value of $33 million.

Table 5: Inshore commercial catch and value by top species, 2016 - 2020

Fish species	Total commercial Inshore fish catch (tonnes) average (2016 - 2020)	Estimated value of fish ($ millions) average (2016 - 2020)
Snapper	6,421	70.9
Jack Mackerel	21,091	33.5
Tarakihi	5,499	33.0
Blue Cod	2,013	31.2
Spiny Dogfish	5,424	27.3
Gurnard	4,021	22.3
Flatfish	2,305	20.3
School Shark	2,827	15.7
Rig	1,404	12.6
Hapuku & Bass	1,083	12.2
Sub-total	52,089	279.0
Other fish species	44,136	104.5
Grand total	96,225	383.5

Source: MPI, BERL

The top ten species accounted for 54 percent of the total average commercial catch of the Inshore fishery, but a significant 73 percent of the total average commercial catch value of the Inshore fishery between 2016 and 2020.

Highly Migratory Species (HMS)

The total average commercial fish catch in the HMS fishery between 2016 and 2020 was 9,752 tonnes, as depicted in Table 6. This is a significant decrease from 16,367 tonnes between 2010 and 2015. Between 2016 and 2020, the total estimated average commercial fish catch value of the HMS fishery was $43.3 million.

The top species within the HMS fishery, by average commercial catch value between 2016 and 2020, were:

- Albacore Tuna, with an average commercial catch value of $19.2 million
- Southern Bluefin Tuna, with an average commercial catch value of $10.8 million
- Swordfish, with an average commercial catch value of $5 million.

These three species accounted for only 40 percent of the total average commercial fish catch within the HMS fishery. However, they accounted for 81 percent of the total estimated commercial fish catch value. This reflects the proportionately higher individual value of these species.

Table 6: HMS commercial catch and value by top species, 2016 - 2020

Fish species	Total commercial Highly Migratory Species (HMS) fish catch (tonnes) average (2016 - 2020)	Estimated value of fish ($ millions) average (2016 - 2020)
Albacore Tuna	2,534	19.2
Southern Bluefin Tuna	937	10.8
Swordfish	443	5.0
Skipjack Tuna	4,983	4.5
Bigeye Tuna	106	1.9
Pacific Bluefin Tuna	24	0.7
Sub-total	9,026	42.1
Other fish species	725	1.2
Grand total	9,752	43.3

Source: BERL, MPI

The top six species accounted for 93 percent of the total average commercial fish catch of the HMS fishery, and 97 percent of the estimated average commercial fish catch value.

Rock Lobster

Between 2016 and 2020, the total average commercial fish catch of Rock Lobster was 2,719 tonnes, as depicted in Table 7. With this, the estimated average commercial value of Rock Lobster between 2016 and 2020 was $148.1 million.

Table 7: Rock Lobster commercial fish catch and value, 2016 - 2020

Fish species	Total commercial fish catch (tonnes) average (2016 - 2020)	Estimated value of fish ($ millions) average (2016 - 2020)
Rock Lobster	2,719	148.1

Source: BERL, MPI

The average commercial value of Rock Lobster increased from $132 million between 2010 and 2015, despite the total average fish catch decreasing by 118 tonnes.

Shellfish

Between 2016 and 2020, the total average commercial fish catch of the Shellfish fishery was 5,175 tonnes, as depicted in Table 8. This has decreased from an estimated 5,505 tonnes between 2010 and 2015. The estimated average commercial fish catch value increased, from $103 million to $128.5 million.

Table 8: Shellfish commercial fish catch and value by top species, 2016 - 2020

Fish species	Total commercial Shellfish fish catch (tonnes) average (2016 - 2020)	Estimated value of fish ($ millions) average (2016 - 2020)
Dredge Oyster	958	41.6
Kina	952	33.5
Paua	105	28.9
Triangle Shell	327	5.8
Cockle	1,165	4.7
Scallop	39	4.2
Sub-total	3,545	118.7
Other fish species	1,630	9.8
Grand total	5,175	128.5

Source: MPI, BERL

The top species within the Shellfish fishery, by estimated average commercial fish catch value between 2016 and 2020, were:

- Dredge Oyster, with an average commercial catch value of $41.6 million
- Kina, with an average commercial catch value of $33.5 million
- Paua, with an average commercial catch value of $28.9 million.

These three species accounted for 81 percent of the total estimated commercial fish catch value of the Inshore fishery, with Dredge Oysters alone accounting for 32 percent.

5 The economic contribution of commercial fishing

The total average output of commercial fishing in New Zealand including both of the Fishing industry and Seafood Processing industry, totalled $5.2 billion in 2020, as depicted in Table 9.[12] The total GDP contribution was $2.19 billion, an increase from $1.6 billion in 2015. Additionally, commercial fishing in New Zealand accounted for 16,522 Full-Time Equivalents (FTEs).[13]

Table 9: Annual average economic contribution of commercial fishing, 2016 - 2020

Sector	Measure	Direct	Indirect	Induced	Total
Deepwater	Output (2020$m)	1,187	1,119	389	2,695
	GDP (2020$m)	429	501	216	1,146
	Employment (FTEs)	3,106	3,842	1,515	8,462
HMS	Output (2020$m)	57	52	17	126
	GDP (2020$m)	20	24	9	53
	Employment (FTEs)	215	186	65	466
Inshore	Output (2020$m)	571	525	173	1,269
	GDP (2020$m)	200	237	96	533
	Employment (FTEs)	1,668	1,815	675	4,158
Shellfish	Output (2020$m)	199	184	61	444
	GDP (2020$m)	70	83	34	187
	Employment (FTEs)	594	639	238	1,471
Rock Lobster	Output (2020$m)	280	261	88	629
	GDP (2020$m)	100	117	49	266
	Employment (FTEs)	731	890	344	1,965
Grand Total	Output (2020$m)	2,294	2,141	728	5,164
	GDP (2020$m)	818	962	405	2,185
	Employment (FTEs)	6,314	7,371	2,837	16,522

Source: BERL

The largest contributors to total output of commercial fishing of $5.2 billion in 2019 were:

- Deepwater fishery which accounted for $2.7 billion
- Inshore fishery which accounted for $1.27 billion
- Rock Lobster fishery which accounted for $629 million.

5.1 Contribution from the Fishing industry and Seafood Processing industry

5.1.1 Economic contribution of the Fishing industry

Between 2016 and 2020, on average, the Fishing industry (harvesting of fish only) earned $1.29 billion in direct output and directly employed 4,359 FTEs, as depicted in Table 10. However overall

[12] This is an average as the multipliers used the average fish catch between 2016 and 2020, and is noted as a contribution in 2020, as it is in 2020 dollars. This is the case for each industry included within this section.
[13] Appendix B provides information on the focus of the economic contribution analysis and relevant definitions.

the Fishing industry contributed a total of $1.1 billion in GDP to the New Zealand economy, and a total of 11,557 FTEs.[14]

Table 10: Annual average economic contribution of the Fishing industry, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	1,288	1,124	286	2,698
GDP (2020$m)	419	518	159	1,096
Employment (FTEs)	4,359	5,567	1,631	11,557

Source: BERL

FMA breakdown of the Fishing industry

The Fishing industry includes the harvesting of fish species, which is done across New Zealand FMAs. Appendix D provides a breakdown of the economic contribution of each FMA individually. The following three FMAs had the most output:

- FMA7, with an average direct output of $250 million
- FMA5, with an average direct output of $193 million
- FMA3, with an average direct output of $185 million.

5.1.2 Economic contribution of the Seafood Processing industry

The Seafood Processing industry purchases raw fish and seafood from the Fishing industry, and then adds value by processing these raw materials for consumption by the domestic or export market. Between 2016 and 2020, on average, the Seafood Processing industry earned $1.54 billion in direct output and directly employed approximately 3,371 FTEs, as depicted in Table 11.

Table 11: Annual average economic contribution of the Seafood Processing industry, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	1,537	1,516	502	3,555
GDP (2020$m)	590	668	279	1,536
Employment (FTEs)	3,371	5,207	2,051	10,629

Source: BERL

The Seafood Processing industry contributed $1.54 billion in GDP to the New Zealand economy, and a total of 10,629 FTEs.

Regional breakdown of the Seafood Processing industry

A significant amount of Seafood Processing occurs in land-based factories, and so annual LEED employment data was used to allocate the output values of the Seafood Processing industry to regional council areas within New Zealand. This allocation is based on the assumption that the value or revenue per worker within the industry is identical, and therefore where there are more workers, more revenue is generated.[15]

The following three regional areas had the most workers and the most revenue:

- Nelson – Tasman – Marlborough, with an average direct output of $399 million

[14] Appendix D provides a detailed breakdown of this economic contribution by each FMA.
[15] Appendix E provides a detailed breakdown of this economic contribution by each region.

- Auckland, with an average direct output of $318 million
- Canterbury, with an average direct output of $230 million.

5.1.3 Combined economic contribution of the Fishing and Seafood Processing industries

There is a significant amount of overlap between the Fishing industry and Seafood Processing industry, with many New Zealand companies operating in both industries. The Fishing industry provides raw products (seafood) for processing, and relies on the Seafood Processing industry to purchase its harvest (raw products). This overlap enables companies to exploit synergies in their fishing, processing, and marketing.

However, due to this overlap, the economic contribution of the two industries combined must account for the overlap to ensure no double count occurs when the output of one industry is an input into the other.

For example the total impact of the Seafood Processing industry, at $1.54 billion in GDP, is composed of:

- $590 million generated directly by the Seafood Processing industry
- $668 million generated by industries that supply the Seafood Processing industry
- $279 million generated from purchases of households which include of employees of the Seafood Processing industry and other industries.

The Fishing industry is the biggest supplier to the Seafood Processing industry. To account for this overlap, we have treated the two industries as a single industry. Doing so, allows us to eliminate the double-counted economic impact that otherwise would have resulted.

Table 12: Annual average economic contribution of Fishing and Seafood Processing, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	2,295	2,142	729	5,166
GDP (2020$m)	818	963	405	2,186
Employment (FTEs)	6,310	7,380	2,838	16,528

Source: BERL

As depicted in Table 12, on average between 2016 and 2020, the combined Fishing and Seafood Processing industry contributed to direct output of $2.3 billion, $818 million in GDP, and directly and indirectly employed 6,310 FTEs. The total contribution of the two industries combined was $2.19 billion to New Zealand GDP.

5.2 The economic contribution by the fishing sector

Deepwater fish are caught at lower depths, which are generally found in New Zealand below the 12 nautical mile limit of the Territorial Sea and out to the 200 nautical mile of the EEZ. The remainder are inshore species, including crustaceans such as Rock Lobster and Crab, which are caught in much shallower waters. A small proportion of all fish harvested migrate between these two areas, known as HMS.

For this research we have split the Inshore area into three fisheries: the Inshore (which is composed of finfish), Rock Lobster and Shellfish fisheries. The reason for this is that the methods of fishing, and the species caught, are quite different between these three fisheries and therefore we want to treat them separately, rather than as a single combined fishery.

5.2.1 Economic contribution of Deepwater fishing

Table 13 shows that, on average between 2016 and 2020, Deepwater fishing from the combined Fishing and Seafood Processing industry contributed a total of $2.7 billion in output to the New Zealand economy. Deepwater fishing contributed a total of $1.1 billion to New Zealand GDP and employed 8,462 FTEs.

Table 13: Annual average economic contribution of Deepwater fishing, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	1,187	1,119	389	2,695
GDP (2020$m)	429	501	216	1,146
Employment (FTEs)	3,106	3,842	1,515	8,462

Source: BERL

5.2.2 Economic contribution of Highly Migratory Species (HMS) fishing

Table 14 shows that, on average between 2016 and 2020, HMS fishing from the combined Fishing and Seafood Processing industry contributed a total of $126 million in output to the New Zealand economy. HMS fishing contributed a total of $53 million to New Zealand GDP and employed 466 FTEs.

Table 14: Annual average economic contribution of HMS, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	57	52	17	126
GDP (2020$m)	20	24	9	53
Employment (FTEs)	215	186	65	466

Source: BERL

5.2.3 Economic contribution of Inshore fishing

Table 15 shows that on average between 2016 and 2020, the share for Inshore species that are finfish, of the combined Fishing and Seafood Processing industry's total economic contribution to the New Zealand economy, was made up of output of $1,269 million, GDP of $533 million and employment of 4,158 FTEs.

Table 15: Annual average economic contribution of Inshore, finfish, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	571	525	173	1,269
GDP (2020$m)	200	237	96	533
Employment (FTEs)	1,668	1,815	675	4,158

Source: BERL

Snapper, Jack Mackerel and Tarakihi are the highest valued Inshore species. Any reduction in the commercial catch of these species would have significant impacts on GDP and employment. Such a reduction could arise from a reduction in the total allowable commercial catch, or a depletion of stocks from an environmental hazard.

5.2.4 Economic contribution of Rock Lobster

Table 16 shows that on average between 2016 and 2020, the total economic contribution of Rock Lobster to the New Zealand economy was an estimated $244 million in GDP, and total employment of approximately 1,800 FTEs.

Table 16: Annual average economic contribution of Rock Lobster, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	280	261	88	629
GDP (2020$m)	100	117	49	266
Employment (FTEs)	731	890	344	1,965

Source: BERL

The $629 million in total output, and employment of 1,965 FTEs comes from an average annual catch of 2,719 tonnes of Rock Lobster.

5.2.5 Economic contribution of Shellfish fishing

Table 17 shows that, on average between 2016 and 2020, Shellfish fishing from the combined Fishing and Seafood Processing industry contributed a total of $444 million in output to the New Zealand economy. Shellfish fishing contributed a total of $187 million to New Zealand GDP, and employed 1,471 FTEs.

Table 17: Annual average economic contribution of Shellfish fishing, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	199	184	61	444
GDP (2020$m)	70	83	34	187
Employment (FTEs)	594	639	238	1,471

Source: BERL

5.3 The economic contribution by ANZSIC06 fishing industries

In this section we present the total economic contribution for the combined Fishing and Seafood Processing industry across the four ANZSIC06 fishing industries. These ANZSIC06 industries are based entirely on the fishing method being utilised to catch fish, rather than on the fish being caught. The economic contributions are based on the average gross revenue across the five years to 2020.

5.3.1 Economic contribution of Trawling, Seining and Netting fishing

The Trawling, Seining and Netting fishing industry includes fish caught using methods such as bottom trawl, Danish purse seine, set net, ring net, purse seine, and mid-water trawl. The most commonly caught species were Hoki, Ling, Orange Roughy and Snapper.

Table 18: Annual average economic contribution of Trawling, Seining and Netting fishing, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	1,475	1,377	468	3,321
GDP (2020$m)	526	619	260	1,405
Employment (FTEs)	3,935	4,719	1,824	10,479

Source: BERL

On average between 2016 and 2020, this industry generated direct output of $1.47 billion, and contributed a total of $3.32 billion to New Zealand output, as depicted in Table 18. The Trawling, Seining and Netting fishing industry directly contributed $526 million to New Zealand GDP, and directly employed 3,935 FTEs. The total contribution to New Zealand GDP was $1.4 billion and total employment was 10,479 FTEs.

5.3.2 Economic contribution of Line fishing

The Line Fishing industry includes methods such as all bottom longline, hand line, dropline, squid jigging, surface longline and troll fishing methods. The main species caught within this industry include Snapper and Ling.

Table 19: Annual average economic contribution of Line fishing, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	219	205	70	494
GDP (2020$m)	78	92	39	209
Employment (FTEs)	737	732	271	1,741

Source: BERL

On average between 2016 and 2020, this industry generated direct output of $219 million, and contributed a total of $494 million to New Zealand output, as depicted in Table 19. The Line fishing industry directly contributed $78 million to New Zealand GDP, and directly employed 737 FTEs. The total contribution to New Zealand GDP was $209 million and total employment was 1,741 FTEs.

5.3.3 Economic contribution of Other fishing

Other fishing includes fishing methods such as fish caught by cod pots, octopus pots, hand gathering, fish traps, dredging, and diving. The main species caught within this industry include Blue Cod and Paua.

Table 20: Annual average economic contribution of Other fishing, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	331	309	105	746
GDP (2020$m)	118	139	59	316
Employment (FTEs)	944	1,073	410	2,427

Source: BERL

On average between 2016 and 2020, this industry generated direct output of $331 million, and contributed a total of $746 million to New Zealand output, as depicted in Table 20. The Other fishing industry directly contributed $118 million to New Zealand GDP, and directly employed 944

FTEs. The total contribution to New Zealand GDP was $316 million and total employment was 2,427 FTEs.

5.3.4 Economic contribution of Rock Lobster and Crab potting

The economic contribution of the Rock Lobster and Crab potting industry is very similar to that of the Rock Lobster fishery. This is because the Spiny Red Rock Lobster and the packhorse Rock Lobster, which comprise the Rock Lobster fishery, are the main two species caught by the Rock Lobster and Crab potting industry. The industry does catch some other fish species, mainly a small amount of Kingfish, Octopus and Carpet Shark, but this additional catch does little to separate the economic contribution of the Rock Lobster fishing and the Rock Lobster and Crab potting industry.

Table 21: Annual average economic contribution of Rock Lobster and Crab potting

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	269	251	85	605
GDP (2020$m)	96	113	47	256
Employment (FTEs)	692	855	332	1,880

Source: BERL

On average between 2016 and 2020, this industry generated direct output of $269 million, and contributed a total of $605 million to New Zealand output, as depicted in Table 21. The Rock Lobster and Crab potting industry directly contributed $96 million to New Zealand GDP, and directly employed 692 FTEs. While the total contribution to New Zealand GDP was $256 million and total employment was 1,880 FTEs.

6 Employment

Employment is an important measure of economic impact, in addition to revenue and GDP, as it measures the impact of the activity by industry type and the location of the worker. The data included in this section is annual LEED data from Statistics New Zealand, which is actual employment counts (not FTEs) derived from PAYE and IR3 taxation returns of individuals. Therefore, the geographic location is defined as the location of the business units where the individual is employed. The following section focusses on employment in the fishing sector, and thus the employment in each industry that operates within the fishing sector, and regional employment. Throughout this section, sector refers to a combination of industries that operate within the one sector.

The employment statistics for the trawling sector have been impacted by the need for any chartered fishing vessels to be registered under New Zealand maritime laws. Whereas crew on those vessels would previously not have been counted as they were part of the chartering arrangement, they are now registered as New Zealand employees, and as New Zealand taxpayers. This change in status has resulted in the apparent increase in employment in the trawling sector seen between 2014 and 2019, despite the number of registered commercial fishing vessels continuing to decline across this period.

6.1 Employment in the wider fishing sector

Employment within the wider fishing sector is spread across a variety of different industries, including Fishing, Processing and service provision. The following are the industries that operate within the wider fishing sector:

- Seafood Processing
- Fish Trawling, Seining and Netting
- Line fishing
- Other fishing
- Rock Lobster and Crab potting
- Shipbuilding and Repair services
- Fish and Seafood Wholesaling.

Total fishing sector employment

Between 2005 and 2019 the fishing sector saw a minor decline in employment, from 12,303 people in 2005 to 11,964 in 2019, as depicted in Table 22.

Table 22: Employment in the wider fishing sector, by industry, 2005 - 2019

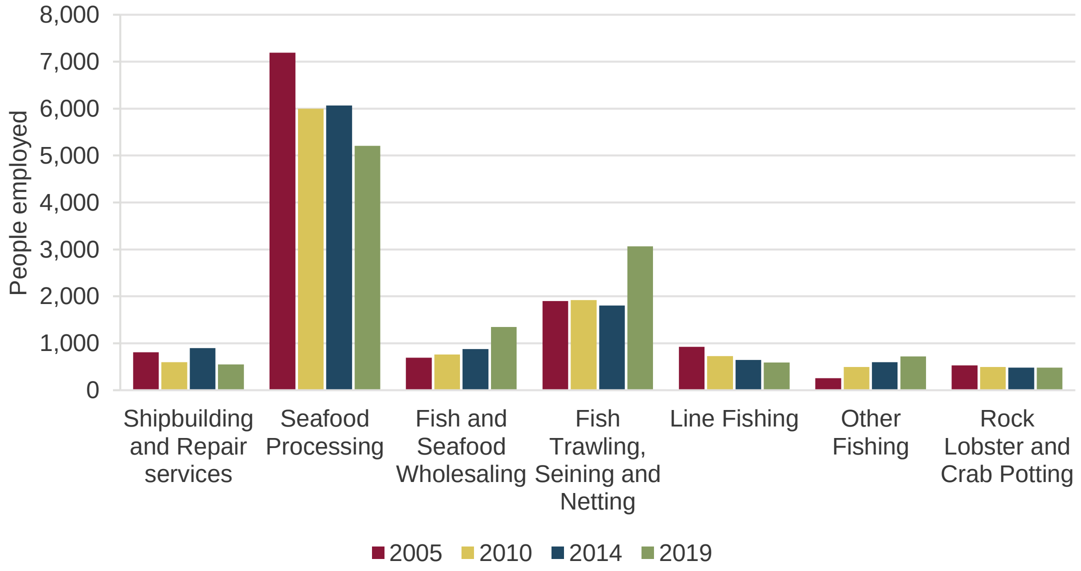
Industries within the fishing sector	2005	2010	2014	2019	Change between 2005 and 2019 (% per annum)
Shipbuilding and Repair services	807	600	897	552	-2.7
Seafood Processing	7,194	6,000	6,063	5,205	-2.3
Fish and Seafood Wholesaling	693	759	876	1,350	4.9
Fish Trawling, Seining and Netting	1,899	1,923	1,803	3,063	3.5
Line Fishing	924	729	642	591	-3.1
Other Fishing	258	498	600	720	7.6
Rock Lobster and Crab Potting	528	492	483	483	-0.6
Total fishing sector	12,303	11,001	11,364	11,964	-0.2

Source: Statistics New Zealand

Across the 14 year period, three of the seven industries included in the wider fishing sector have experienced an overall increase in employment, as depicted in Table 22 and Figure 4. These three industries are:

- The Fish and Seafood Wholesaling industry where employment has increased from 693 people in 2005 to 1,350 people in 2019, with a per annum increase of 4.9 percent
- The Fish Trawling, Seining and Netting industry where employment has increased from 1,899 people in 2005 to 3,063 people in 2019, with a per annum increase of 3.5 percent[16]
- The Other fishing industry where employment has increased from 258 people in 2005 to 720 people in 2019, with a per annum increase of 7.6 percent.

Figure 4: Wider fishing sector employment, New Zealand, 2005 - 2019



Source: Statistics New Zealand

[16] Employment numbers have increased, in comparison to the 2014, as a direct result of chartered vessels which are registered as New Zealand vessels, now required to register foreign crew members as New Zealand employees, when previously they did not need to register these crew members, and therefore these crew members were omitted from the count of employees.

The remaining four industries (Shipbuilding and Repair services, Seafood Processing, Line fishing, and Rock Lobster and Crab potting) experienced relatively small per annum percentage decreases between 2005 and 2019. The largest per annum decrease was in the Line fishing industry, where employment decreased from 924 people in 2005 to 591 people in 2019, a per annum decrease of 3.1 percent.

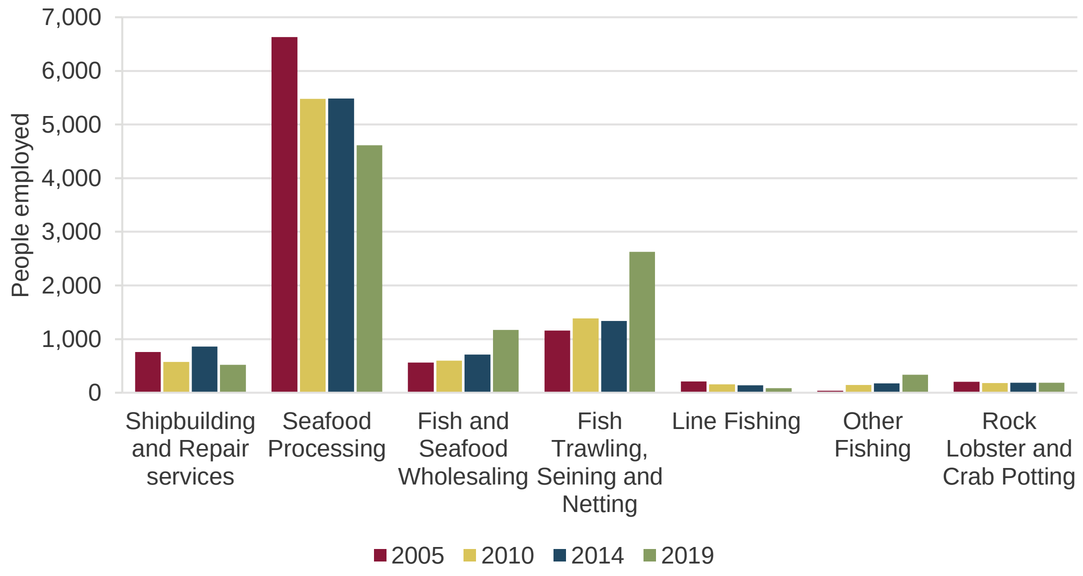
Fishing sector wage and salary employment[17]

Total wage and salary employment in the wider fishing sector only slightly decreased (9,558 people to 9,537 people) between 2005 and 2019. After a dip in 2010 and 2014, wage and salary employment increased again in 2019 back to levels similar to those seen in 2005.

As depicted in Figure 5 wage and salary employment decreased, in four of the seven industries included in the fishing sector, between 2005 and 2019. These four industries were:

- Shipbuilding and Repair services, where employment decreased from 759 people to 522 people
- Seafood Processing, where employment decreased from 6,627 people to 4,614 people
- Line fishing, where employment decreased from 210 people to 84 people
- Rock Lobster and Crab potting, where employment decreased from 201 people to 189 people.

Figure 5: Wider fishing sector wage and salary employment, New Zealand, 2005 - 2019



Source: Statistics New Zealand

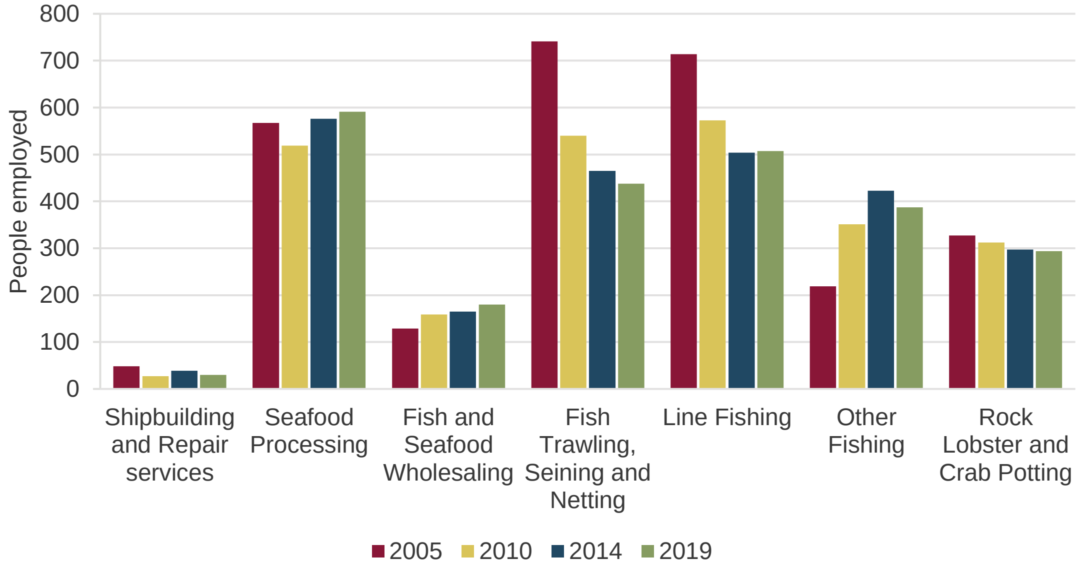
Between 2005 and 2019, employment increased in the following industries: Fish and Seafood Wholesaling; Fish Trawling, Seining and Netting; and Other fishing. Other fishing had a significant per annum percentage increase of 16.6 percent, followed by Fish Trawling, Seining and Netting with a per annum percentage increase of six percent.

Wider fishing sector self-employment

Total self-employment in the wider fishing sector decreased slightly between 2005 and 2019, with a per annum change of negative one percent.

[17] Wage and salary employment is referring to working for someone else rather than one's self.

Figure 6: Wider fishing sector self-employment, New Zealand, 2005 - 2019



Source: Statistics New Zealand

As depicted in Figure 6, self-employment in the fishing sector declined across four of the seven industries. These industries were: Shipbuilding and Repair services, Fish Trawling, Seining and Netting, Line fishing, and Rock Lobster and Crab potting. However, the following three industries experienced increases in self-employment between 2005 and 2019:

- Seafood Processing, where self-employment increased from 567 people to 591 people
- Fish and Seafood Wholesaling, where self-employment increased from 129 people to 180 people
- Other fishing, where self-employment increased from 219 people to 387 people.

6.2 Employment changes by region

Across the wider fishing sector between 2005 and 2019, two industries experienced significant changes in the location of employment in New Zealand. These two industries were:

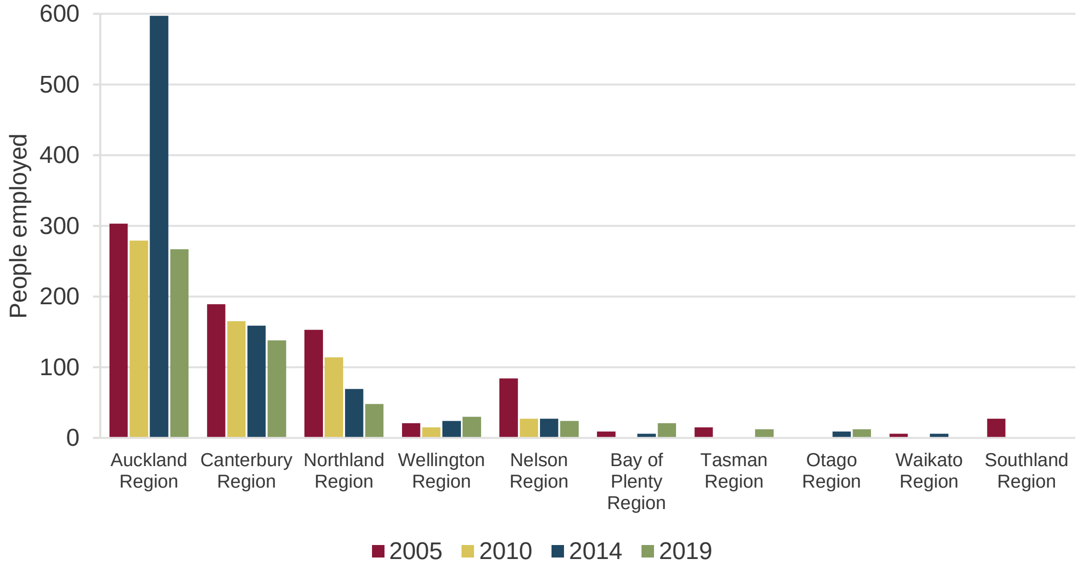
- Shipbuilding and Repair services
- Seafood Processing.

The other industries mentioned previously did not experience such significant changes in the location of employment in comparison to Shipbuilding and Repair services, and Seafood Processing.

Shipbuilding and Repair services employment

As depicted in Figure 7, there was a significant transition from rural regions to more urban regions between 2010 and 2014, as exemplified by the large increase in employment in the Auckland region. However, following this significant increase, there was a significant decrease across the country, and in particular in Auckland, which went from 597 people in 2014, to 267 people in 2019. This was largely caused by an overall decrease in employment in Shipbuilding and Repair services across New Zealand between 2014 and 2019. In particular 2015 saw a strong decline in employment in superyacht builders in New Zealand, which were mainly based in Auckland, as sales of superyachts dried up.

Figure 7: Shipbuilding and Repair services employment by top ten regions, 2005 - 2019



Source: Statistics New Zealand

Seven of the top ten regions experienced decreases in total employment in the Shipbuilding and Repair services industry between 2005 and 2019. The following three regions were those that did not have a decline in employment in that industry during that period:

- Otago region, where employment increased from zero people to twelve people
- Bay of Plenty region, where employment increased from nine people to 21 people
- Wellington region, where employment increased from 21 people to 30 people.

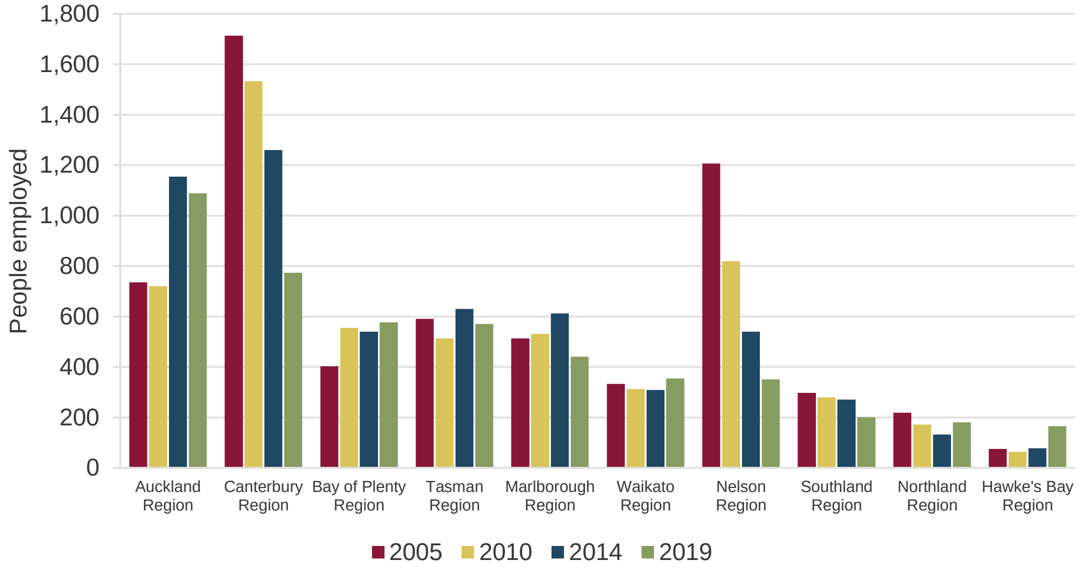
Seafood Processing employment

In 2019, the Seafood Processing industry employed a total of 5,205 people, which was a significant decrease from 7,194 people in 2005.

Figure 8 highlights the change in employment counts in Seafood Processing between 2005 and 2019 for the top ten regions in New Zealand. There has been significant change in a few regions. Most notably, employment in the Seafood Processing industry in Canterbury decreased from 1,260 people in 2014, to 774 people in 2019. The following regions also experienced decreases in employment between 2014 and 2019:

- Auckland, where employment decreased from 1,155 people to 1,089 people
- Tasman, where employment decreased from 630 people to 570 people
- Marlborough, where employment decreased from 612 people to 441 people
- Nelson, where employment decreased from 540 people to 351 people
- Southland, where employment decreased from 270 people to 201 people.

Figure 8: Seafood Processing industry employment by top ten regions, 2005 - 2019



Source: Statistics New Zealand

Only four of the top ten regions had an increase in employment in the Seafood Processing industry between 2005 and 2019, these being;

- Bay of Plenty, which employed 576 people in 2019 (increased by 36 people)
- Waikato, which employed 354 people in 2019 (increased by 45 people)
- Northland, which employed 180 people in 2019 (increased by 48 people)
- Hawke's Bay, which employed 165 people in 2019 (increased by 87 people).

Appendix A Definitions of industry classifications

This appendix provides definitions of fishing methods and industries mentioned throughout this report, as well as providing the primary activities involved and the appropriate classifications. All definitions have been sourced from the *Australia and New Zealand Standard Industrial Classification 2006 (ANSIC06)*, Australia Bureau of Statistics.

Rock Lobster and Crab potting (Class 0411)

This class consists of units mainly engaged in catching Rock Lobsters or Crabs from their natural habitats of ocean or coastal waters, using baited pots.

Primary activities

Primary activities in Rock Lobster and Crab potting are:

- Crab fishing or potting
- Rock Lobster fishing or potting
- Saltwater Crayfish fishing.

Exclusions/References

Units mainly engaged in:

- Wholesaling fresh or frozen Rock Lobsters are included in Class 3604 Fish and Seafood Wholesaling
- Farming crustaceans in tanks or ponds onshore are included in Class 0203 Onshore Aquaculture.

Line fishing (Class 0413)

This class consist of units mainly engaged in Line fishing in Inshore, mid-depth or surface waters. This class includes units engaged in several fishing methods, including surface or bottom long lining, trolling, or hand or powered-reel fishing.

Primary activities

The primary activities in Line fishing are:

- Bottom long Line fishing
- Line fishing
- Ocean trolling
- Squid jigging
- Surface long Line fishing.

Exclusions/References

Units mainly engaged in:

- Trawling, Seining, or Netting are included in Class 0414 Fish Trawling, Seining and Netting.

Fish Trawling, Seining, and Netting (Class 0414)

This class consists of units mainly engaged in Trawling, Seining or Netting in mid-depth to deep-ocean or coastal waters using a variety of net fishing methods. Trawling methods involve one or two boats towing a very large bag net, either on the sea bed or in mid-depth waters. Seining methods include purse, Danish or beach Seining. Netting methods include surface or bottom gill netting.

Primary activities

The primary activities in Fish Trawling, Seining and Netting are:

- Beach Seining, fishing
- Bottom gill netting, fishing
- Danish Seining, fishing
- Finfish trawling
- Pair trawling
- Purse Seining
- Set netting, fishing
- Surface netting, fishing.

Exclusions/References

Units mainly engaged in:

- Line fishing are included in Class 0413 Line fishing
- Hatching or farming fish in controlled environments are included in the appropriate classes of Group 020 Aquaculture
- Wholesaling fresh or frozen finfish are included in Class 3604 Fish and Seafood Wholesaling.

Other fishing (Class 0419)

This class consists of units mainly engaged in fishing not elsewhere classified, or in other types of marine life gathering.

Primary activities

Primary activities in Other fishing are:

- Abalone/Paua fishing
- Freshwater ell fishing
- Freshwater fishing n.e.c.
- Marine water fishery product gathering
- Oyster catching (except from cultivated oyster beds)
- Pearling (except oyster farming)
- Seaweed harvesting
- Spat catching

- Turtle hunting.

Exclusions/References

Units mainly engaged in:

- Hatching or farming seaweed, fish, crustaceans or molluscs in controlled environments are included in the appropriate classes of Group 020 Aquaculture
- Potting for Rock Lobster or Crabs are included in Class 0411 Rock Lobster and Crab potting.

Seafood Processing (Class 1120)

This class consists of units mainly engaged in processing fish or other seafoods. Processes include skinning or shelling, grading, filleting, boning, crumbing, battering and freezing of the seafood. This class also includes units mainly engaged in operating vessels which gather and process fish or other seafoods.

Primary activities

Primary activities in Seafood Processing are:

- Crustacean, processed, manufacturing (including cooked and/or frozen) n.e.c.
- Fish cleaning or filleting
- Fish fillet manufacturing
- Fish loaf or cake manufacturing
- Fish paste manufacturing
- Fish pate manufacturing
- Fish, canned, manufacturing
- Fish, dried or smoked, manufacturing
- Mollusc, processed, manufacturing (including shelled)
- Oyster, shelling, freezing or bottling in brine
- Scallop, preserved, manufacturing
- Seafood canned, manufacturing
- Seafood, preserved, manufacturing
- Whole finfish freezing.

Exclusions/References

Units mainly engaged in: gathering fish or other seafoods are included in the appropriate classes of Group 041 Fishing.

Shipbuilding and Repair services (Class 2391)

This class consists of units mainly engaged in manufacturing or repairing vessels of 50 tonnes and over displacement, submarines or major components for ships and submarines not elsewhere classified.

Primary activities

Primary activities in Shipbuilding and Repair services are:

- Drydock operation
- Hull cleaning
- Ship repairing
- Ship wrecking
- Shipbuilding
- Submarine construction.

Exclusions/References

Units mainly engaged in:

- Building boats are included in Class 2392 Boatbuilding and Repair Services.

Fish and Seafood Wholesaling (Class 6604)

This class consist of units mainly engaged in wholesaling fresh or frozen fish or other seafood (except canned).

Primary activities

Primary activities in Fish and Seafood Wholesaling are:

- Crustacean wholesaling (including processed, except canned)
- Fish wholesaling
- Mollusc wholesaling (including processed, except canned)
- Seafood, fresh or frozen, wholesaling.

Exclusions/References

Units mainly engaged in:

- Operating vessels which both catch and process fish or other seafood are included in the appropriate cases of Group 041 Fishing
- Cleaning, cooking or freezing crustaceans or molluscs (including shelling and bottling oysters) or in freezing filleted fish (including whole finfish) are included in Class 1120 Seafood Processing
- Wholesaling canned fish or seafood are included in Class 3609 Other Grocery Wholesaling
- Wholesaling fish or seafood in conjunction with a wide variety of other grocery items included in Class 3601 General Line Grocery Wholesaling.

Appendix B Economic contribution analysis information and definitions

Information on economic contribution analysis

Section 5 breaks down BERL's estimates of the economic contribution of commercial fishing in 2019. This analysis focuses on:

- The Fishing industry, which catches fish
- The Seafood Processing Industry, which processes the catch
- The combined Fishing and Seafood Processing Industries seen as one integrated industry
- Fishing by sector – Deepwater, Inshore, HMS, Rock Lobster and Shellfish
- ANZSIC06 Fishing industry by fishing method – Fish Trawling, Seining and Netting, Line fishing, Other fishing, and Rock Lobster and Crab potting
- FMA – Geographic marine locations
- Regions – Geographic land-based locations
- Average annual catches.[18]

Standard multiplier analysis techniques are used to determine the direct, indirect and induced economic contributions for outputs (gross revenue), GDP (value added) and employment (FTEs). Output values underpin the multiplier analysis and are derived from commercial catch values by FMA, fishing method and main species.

Definitions

The following will include definitions of output, GDP, employment (FTEs), and the difference between direct, indirect and induced effects used in a multiplier analysis.

Definition of output (gross revenue)

Gross output is the value of production, built up through the national accounts as a measure, in most industries, of gross sales or turnover. This is expressed in $million at constant prices. Gross output is made up of the sum of:

- Compensation of employees (i.e. salaries and wages)
- Income from self-employment
- Profits
- Indirect taxes less subsidies
- Intermediate purchases of goods (other than stock in trade)
- Intermediate purchases of services.

[18] It is not possible to reconcile the FMA's and the regions as one is marine-based and the other is land-based. Additionally, the Hawke's Bay and Gisborne regions are grouped together, as are Nelson, Tasman and Marlborough.

Definition of GDP (value added)

Value added multipliers measure the increase in output generated along the production chain, which, in aggregate, totals Gross Domestic Product (GDP). Value added is made up of the sum of:

- Compensation of employees (i.e. salaries and wages)
- Income from self-employment
- Profits
- Indirect taxes less subsidies.

Definition of employment (FTEs)

Employment impact multipliers determine the number of FTE roles that are created for every $1 million spent in an industry for one year. It provides a measure of total labour demand associated with gross output.

An FTE is an estimate of numbers employed assuming full-time positions equal one employee, and part-time positions equal 0.5 of an employee.

Differentiating between direct, indirect and induced effects

The underlying logic of multiplier analysis is relatively straightforward. An initial expenditure (direct effect) in an industry creates flows of expenditures that are magnified, or “multiplied”, as they flow on to the wider economy.

This flow occurs in two ways:

- The industry purchases materials and services from supplier firms, who in turn make further purchases from their suppliers. This generates an indirect (upstream) effect
- People employed in the direct development, and in firms supplying services, earn income (mostly from wages and salaries, but also from profits) which, after tax is deducted, is then spent on consumption. There is also an allowance for some savings. These are the induced (downstream) effects.

Hence, for any amount spent in an area (direct effect), the actual output generated from that spend is greater once the flow-on activity generated (indirect and induced effects) is taken into account.

Leakages

Generally the more developed, or self-sufficient an industry in a region or country is, the higher the multiplier effects. Conversely, the more reliant an industry is on supply inputs from outside the region or country, the lower the multipliers. These outside factors can be referred to as “leakages”.

To put this another way, if a house was purchased in the Taranaki region, and all the materials and labour were sourced in the Taranaki region, and all the materials and labour that went into making the housing materials were made in the Taranaki region, and then the labour spent their wages or salaries in the Taranaki region, again on goods or services produced solely in the Taranaki region, then all the multiplier effects would be captured by the Taranaki region. Whereas if inputs or outputs came from outside the Taranaki region, leakages are said to exist, and the multiplier effect is reduced.

Limitations of multiplier analysis

Multiplier analysis is only a “partial equilibrium” analysis, assessing the direct and indirect effects of the development being considered, without analysing the effects of the resources used on the wider national and regional economy.

In particular, it assumes that the supply of capital, productive inputs and labour can expand to meet the additional demand called forth by the initial injection and the flow-on multiplier effects, without leading to resource constraints in other industries. These constraints would lead to price rises and resulting changes in the overall patterns of production between industries.

To assess inter-industry impacts in full would require economic modelling within a “general equilibrium” framework. Applying such models becomes more relevant where the particular development is considered significant within the overall economy.

Related to “partial equilibrium”, using multipliers for economic impact assessments assumes that the event is something that would not have been undertaken anyway and that it will not displace existing activity. That is, the event is additional to existing activity. If it does either of the above, then the economic impact is less than that determined by the multiplier and it would be necessary to subtract both the activity that would have occurred anyway and the displacement effect.

Again related to “partial equilibrium”, multiplier analysis assumes that an event will not have an impact on relative prices. However, in a dynamic environment, it can be assumed that a large event would have an impact on demand and supply and hence prices. Hence, the larger the event and the more concentrated it is in a single industry or region, the more likely it is that the multipliers would give an inaccurate analysis of impacts. For example, if multiplier analysis was used to determine the effect of residential building construction nationally, it would likely be inaccurate as residential building construction accounts for over six percent of GDP.

Aggregation

Industries outlined in input-output tables are aggregates of smaller sub-industries. Each sub industry has unique inputs and outputs. The higher the level of aggregation the less accurate these inputs and outputs become. Thus, if determining the multiplier effect of a very specific event using highly aggregated data, there will be a lower level of accuracy. Similarly, if an event encompasses a range of industries and multipliers from a single industry are applied the accuracy levels will diminish.

Regions and boundaries

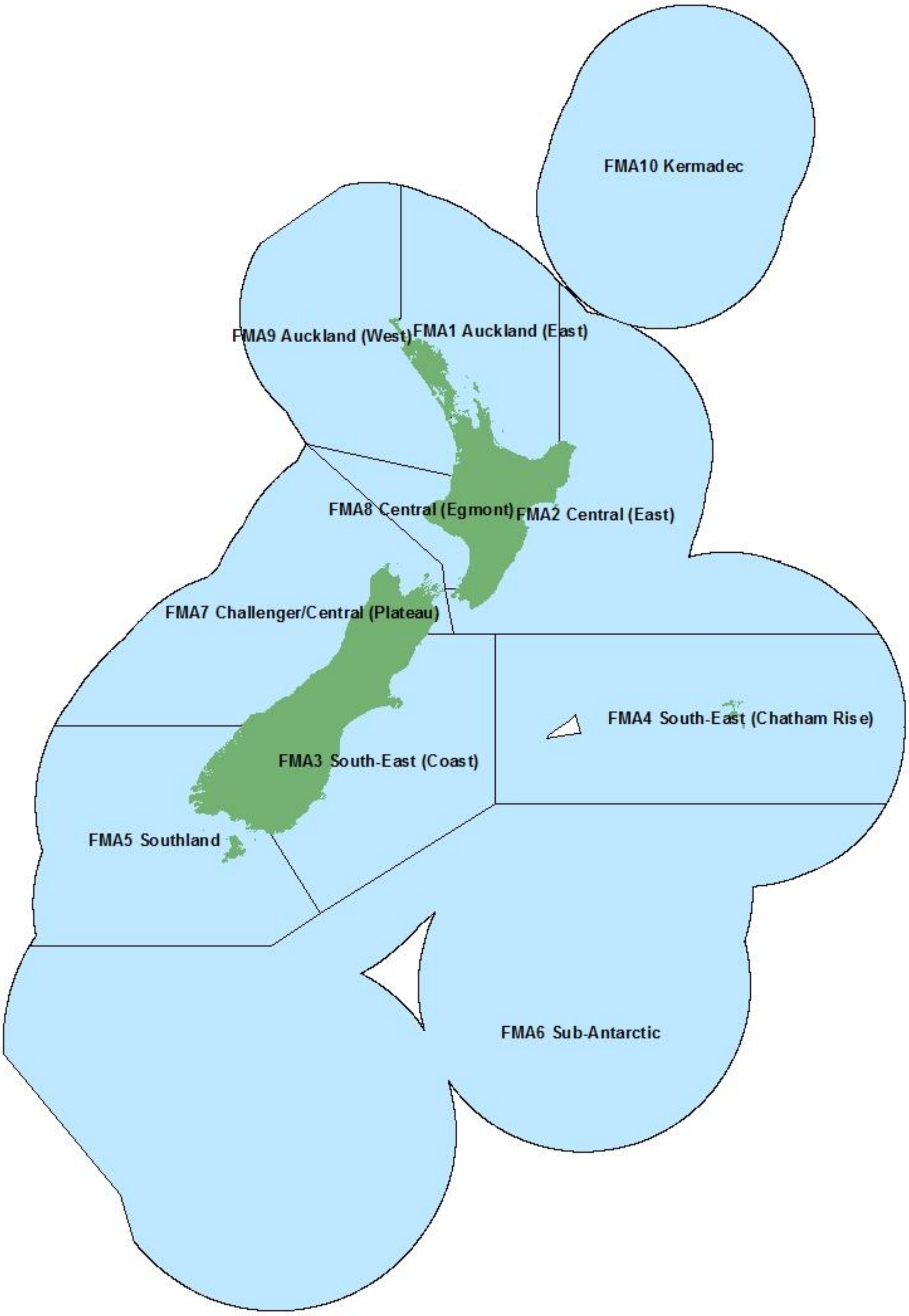
The smaller or less defined a region and its boundaries, the less accurate the multiplier analysis will be. Similarly, the easier it is to move across boundaries, the less accurate the analysis will be. For example, at the national level, the multipliers will be very accurate as it is easy to determine the inputs and outputs crossing through a country’s borders.

Similarly, it would also be more accurate to determine a regional split where there is a clear geographic boundary. As smaller regions, without obvious geographic boundaries are selected, more assumptions need to be made and the multipliers become less accurate. For example, an individual could work in the Auckland region but live in the Waikato region and spend a large proportion of his/her recreation money in the Bay of Plenty region.

For any regional analysis the level of accuracy will have to be accepted. As a rule of thumb, the larger and more defined the region, the more accurate the analysis will be.

Appendix C Fishing Management Area (FMA) map

Figure 9: Fishing Management Area (FMA) map



Appendix D Economic contribution of fishing (harvesting only) by FMA

This section provides a breakdown of the economic contribution (harvesting only) of the main nine FMAs in New Zealand's EEZ in 2020. Kermdacs (FMA10) is not included due to the small quantity of fish caught in the FMA each year. (As illustrated in Appendix C).

Table 23: Annual average economic contribution of FMA1, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	138	120	31	289
GDP (2020$m)	45	55	17	117
Employment (FTEs)	723	923	270	1,916

Source: BERL

Table 24: Annual average economic contribution of FMA2, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	116	101	26	243
GDP (2020$m)	38	47	14	99
Employment (FTEs)	347	443	130	919

Source: BERL

Table 25: Annual average economic contribution of FMA3, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	185	162	41	388
GDP (2020$m)	60	75	23	158
Employment (FTEs)	457	583	171	1,211

Source: BERL

Table 26: Annual average economic contribution of FMA4, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	148	129	33	309
GDP (2020$m)	48	59	18	126
Employment (FTEs)	113	145	42	300

Source: BERL

Table 27: Annual average economic contribution of FMA5, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	193	168	43	404
GDP (2020$m)	63	78	24	164
Employment (FTEs)	205	262	77	545

Source: BERL

Table 28: Annual average economic contribution of FMA6, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	145	126	32	303
GDP (2020$m)	47	58	18	123
Employment (FTEs)	277	354	104	734

Source: BERL

Table 29: Annual average economic contribution of FMA7, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	250	219	56	525
GDP (2020$m)	81	101	31	213
Employment (FTEs)	1,828	2,335	684	4,847

Source: BERL

Table 30: Annual average economic contribution of FMA8, 2016 – 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	51	45	11	107
GDP (2020$m)	17	21	6	44
Employment (FTEs)	157	200	59	416

Source: BERL

Table 31: Annual average economic contribution of FMA9, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	62	54	14	129
GDP (2020$m)	20	25	8	52
Employment (FTEs)	252	322	94	669

Source: BERL

Appendix E Economic contribution (processing only) by region

This section provides a breakdown of the economic contribution (processing only) of regions in New Zealand in 2020.

Table 32: Annual average economic contribution of Northland region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	54	53	18	125
GDP (2020$m)	21	23	10	54
Employment (FTEs)	118	183	72	373

Source: BERL

Table 33: Annual average economic contribution of Auckland region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	318	314	104	736
GDP (2020$m)	122	138	58	318
Employment (FTEs)	698	1,078	425	2,201

Source: BERL

Table 34: Annual average economic contribution of Waikato region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	105	104	34	243
GDP (2020$m)	40	46	19	105
Employment (FTEs)	230	356	140	726

Source: BERL

Table 35: Annual average economic contribution of Bay of Plenty region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	170	168	56	394
GDP (2020$m)	65	74	31	170
Employment (FTEs)	374	577	227	1,178

Source: BERL

Table 36: Annual average economic contribution of Hawke's Bay-Gisborne region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	67	151	50	267
GDP (2020$m)	26	66	28	120
Employment (FTEs)	146	518	204	867

Source: BERL

Table 37: Annual average economic contribution of Manawatu-Whanganui region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	26	26	9	61
GDP (2020$m)	10	11	5	26
Employment (FTEs)	58	90	35	183

Source: BERL

Table 38: Annual average economic contribution of Wellington region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	26	25	8	59
GDP (2020$m)	10	11	5	26
Employment (FTEs)	56	87	34	178

Source: BERL

Table 39: Annual average economic contribution of Nelson-Tasman-Marlborough region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	399	393	130	922
GDP (2020$m)	153	173	72	399
Employment (FTEs)	875	1,351	532	2,758

Source: BERL

Table 40: Annual average economic contribution of West Coast region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	41	41	14	96
GDP (2020$m)	16	18	8	41
Employment (FTEs)	91	140	55	286

Source: BERL

Table 41: Annual average economic contribution of Canterbury region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	230	227	75	531
GDP (2020$m)	88	100	42	230
Employment (FTEs)	504	778	307	1,589

Source: BERL

Table 42: Annual average economic contribution of Otago region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	31	31	10	72
GDP (2020$m)	12	14	6	31
Employment (FTEs)	69	106	42	216

Source: BERL

Table 43: Annual average economic contribution of Southland region, 2016 - 2020

Measure	Direct	Indirect	Induced	Total
Output (2020$m)	60	59	19	138
GDP (2020$m)	23	26	11	60
Employment (FTEs)	131	202	79	412

Source: BERL