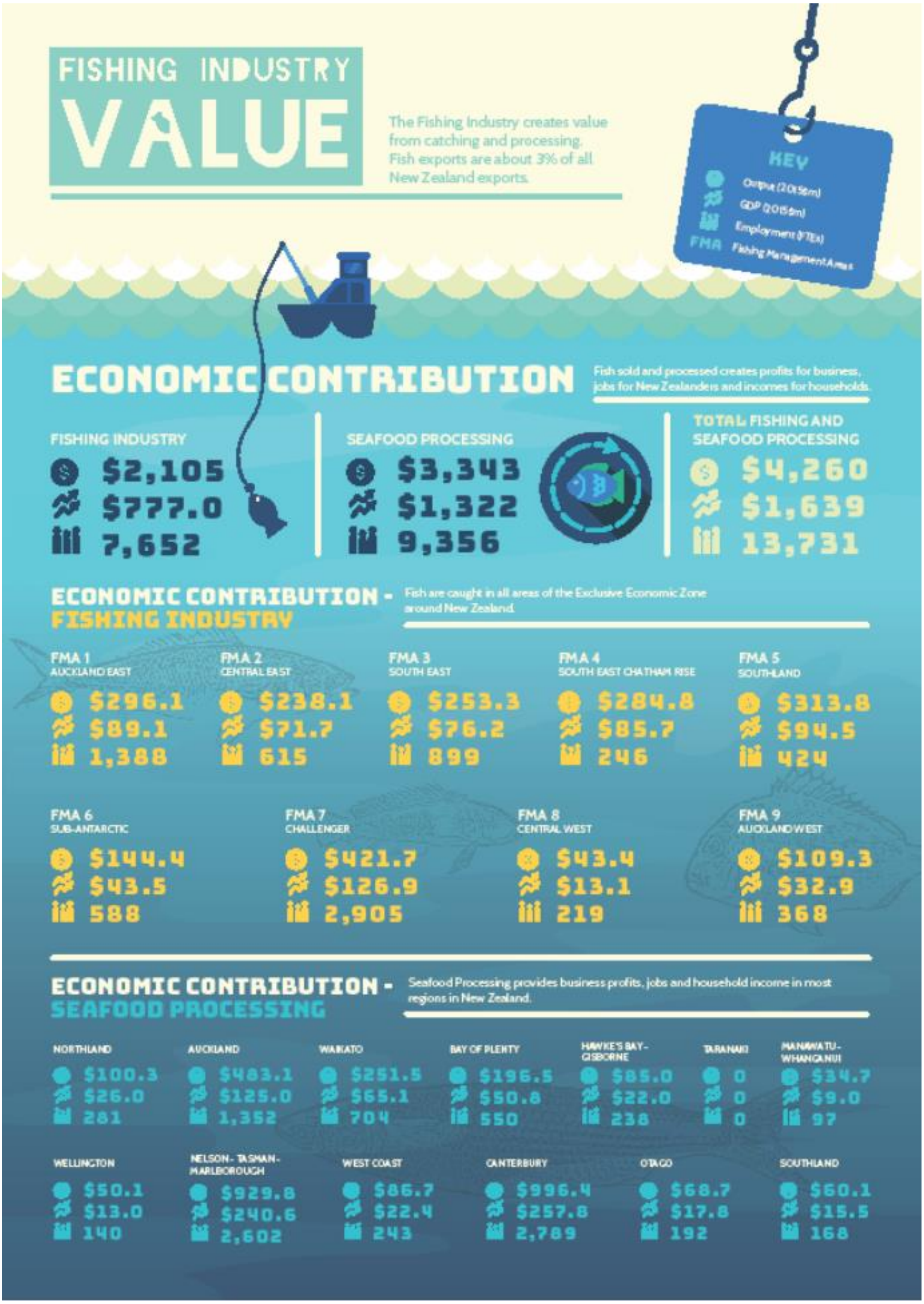
The economic contribution of commercial fishing to the New Zealand economy

January 2017

www.berl.co.nz

Authors: Julian Williams, Fiona Stokes, Hugh Dixon and Konrad Hurren


FISHING INDUSTRY
VALUE
The Fishing Industry creates value from catching and processing. Fish exports are about 3% of all New Zealand exports.
KEY
Output (2015$m)
GDP (2015$m)
Employment (FTEs)
FMA Fishing Management Areas
ECONOMIC CONTRIBUTION
Fish sold and processed creates profits for business, jobs for New Zealanders and incomes for households.
FISHING INDUSTRY
$2,105
$777.0
7,652
SEAFOOD PROCESSING
$3,343
$1,322
9,356
TOTAL FISHING AND SEAFOOD PROCESSING
$4,260
$1,639
13,731
ECONOMIC CONTRIBUTION - FISHING INDUSTRY
Fish are caught in all areas of the Exclusive Economic Zone around New Zealand.
FMA 1 AUCKLAND EAST
$296.1
$89.1
1,388
FMA 2 CENTRAL EAST
$238.1
$71.7
615
FMA 3 SOUTH EAST
$253.3
$76.2
899
FMA 4 SOUTH EAST CHATHAM RISE
$284.8
$85.7
246
FMA 5 SOUTHLAND
$313.8
$94.5
424
FMA 6 SUB-ANTARCTIC
$144.4
$43.5
588
FMA 7 CHALLENGER
$421.7
$126.9
2,905
FMA 8 CENTRAL WEST
$43.4
$13.1
219
FMA 9 AUCKLAND WEST
$109.3
$32.9
368
ECONOMIC CONTRIBUTION - SEAFOOD PROCESSING
Seafood Processing provides business profits, jobs and household income in most regions in New Zealand.
NORTHLAND
$100.3
$26.0
281
AUCKLAND
$483.1
$125.0
1,352
WAIKATO
$251.5
$65.1
704
BAY OF PLENTY
$196.5
$50.8
550
HAWKE'S BAY-GISBORNE
$85.0
$22.0
238
TARANAKI
0
0
0
MANAWATU-WHANGANUI
$34.7
$9.0
97
WELLINGTON
$50.1
$13.0
140
NELSON-TASMAN-MARLBOROUGH
$929.8
$240.6
2,602
WEST COAST
$86.7
$22.4
243
CANTERBURY
$996.4
$257.8
2,789
OTAGO
$68.7
$17.8
192
SOUTHLAND
$60.1
$15.5
168

Commercial Fishing a Significant Contributor to New Zealand Economy

Commercial fishing plays a significant part in the New Zealand economy. This report, prepared for the New Zealand commercial fishing industry, concludes that in 2015, commercial fishing provided:

- a direct output value of $1.76 billion and a total output value of $4.26 billion;
- a direct economic contribution $0.55 billion and a total economic contribution of $1.6 billion, being 0.7% of NZ GDP,
- direct employment of 4,394 FTEs and total employment of 13,730 FTEs , being 0.7% of NZ employment; and
- exports of $1.5 billion, being New Zealand's fifth largest export commodity by value and representing 3.2 percent of total exports.

Commercial fishing comprises both fishing and seafood processing activities. Fishing activities made up about 50 percent of the value and economic contribution of commercial fishing.

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 are exploited in their fishing, processing and marketing. Our valuations account for this overlap.

The commercial fishing industry valuations in this report are unique and given in terms of economic contributions:

- for fishing sectors: deepwater; inshore; highly migratory; and shellfish
- for fishing gear and species
- for the Fishing industry and the Seafood Processing industry, separately as well as combined
- derived from catch data from the Ministry for Primary Industries
- for "capture" fishing and so excludes the contribution of the aquaculture industry

In the five years to 2015, on average:

- deepwater fishing had an output value of $1,787 million, GDP of $688 million and employment of 5,759 FTEs
- highly migratory species had an output of $172 million, GDP of $66 million and employment of 554 FTEs
- inshore finfishing had an output of $1,199 million, GDP of $460 million and employment of 3,867 FTEs
- rock lobster harvesting had an output of $799 million, GDP of $310 million and employment of 2,563 FTEs
- shellfish harvesting had an output of $303 million, GDP of $114 million and employment of 986 FTEs.

Hoki is the top commercial fish species for deepwater fishing, followed by Ling and Arrow Squid, these species accounting for the bulk of the value of the deepwater fishery. Hoki accounts for 39 percent of value for deepwater fisheries and 16 percent of the total commercial fishing value.

The economic contribution of the inshore sector mainly consists of: finfish (52 percent); rock lobster (35 percent), and shellfish (13 percent). Paua contributes about 90 percent of the economic impact of the shellfish sector. Snapper meanwhile contributes about 19 percent of the finfish industry. The trawling, seining and netting gear sub-industry is the most significant contributor of value, providing 60 percent of the fishing value and economic contribution.

FMA 7 Challenger has the largest average catch value, at $167.7 million over the five years to 2015, followed by FMA 5 Southland ($146.4 million) and FMA 1 Auckland East ($142.9 million). FMA1 has the largest catch value for a North Island FMA. Employment in the Fishing sector is similar in magnitude to that of Beef Cattle Farming. Within the Fishing sector, the Seafood Processing industry has greater employment than the Fruit and Vegetable Processing industry and has similar employment to the Apple and Pear Growing industry.

Contents

Tables

Figures

1 Introduction

The focus of our research is marine fishing, excluding aquaculture.

This report was commissioned by Fisheries Inshore New Zealand Limited (FINZ) to provide an evidence base of the value of commercial fishing to the New Zealand economy in order to inform fisheries management decisions. FINZ is a non-profit organisation that was established by quota owners, annual catch entitlement (ACE) holders and fishers to work together to advocate for their interests in inshore finfish, pelagic and tuna fish stocks. FINZ ensures that New Zealand gains the maximum economic yields from its inshore fisheries resources, managed within a long-term sustainable framework.

This report is unique in that we provide estimates of catch value and economic contribution for segments of the commercial fishing industry by:

- sectors - deepwater, highly migratory, inshore, and shellfish
- geographic location
- methods of catch
- species
- employment.

We have done this on the basis of the catch data held by the Ministry for Primary Industries (MPI).

In this report, "economic contribution" is defined as the gross change[1] in a nation's existing economy that can be attributed to a given industry. Economic contributions occur from transactions in a market setting. Commercial fishing refers to commercial (profit-oriented businesses) fishing for the capture (non-farmed) marine (non-freshwater) fish. The economic contribution of the commercial fishing industry is set in a historical context as well as a global context.

Our study reported here differs in important ways from previous studies of other authors on economic contributions of the commercial fishing industry. In particular, this study:

- estimates direct output for the fishing sector that is specifically designed to cover capture fishing and to exclude aquaculture (in either seafood processing or fishing and aquaculture industries).
- uses a five year average catch and value data, which covers the five years up to 2014/15.
- makes use of the latest version of Statistics New Zealand Input-Output tables, whereas previous studies could not.

Chapter 2 provides an overview of the evolution of the commercial fishing industry. Chapter 3 presents the conceptual and empirical methodologies of the study. Chapter 4 presents catch volumes and value. Chapter 5 reports the economic contribution resulting from catch value. Chapter 6 explains the scale and scope of employment in the commercial fishing industry.

The objectives of this study are to provide an evidence base of the value of commercial fishing to the New Zealand economy by:

- Sector:

[1] Where the change is often measured in terms of output, value added, and employment.

A fundamental difference of this report compared with other previous reports is that it provides sector valuations. Such a valuation clearly shows, the impact on the economy that would arise from fisheries management decisions including variations in the total allowable commercial catch.

- Species

This report reveals the considerable value that is concentrated in a limited number of species. It reveals the risk to economic value should the catch of those species be reduced by fisheries management decisions.

- Region

This report highlights the importance of different fishing areas to overall economic value. Value by region is influenced by sector and species. Reduction in fishing activity in one geographical area is not compensated by increased fishing in other areas.

- Employment

This report shows that employment in the fishing sector is comparable to employment in other sectors important to the economy including for export revenue.

- Methodology

This study uses a transparent input/output multiplier methodology to calculate economic contribution. The results are easily verifiable and reproducible.

2 Overview

We begin our discussion with descriptive statistics on fisheries resources and the fishing industry including for species, exports and quota.

2.1 Fisheries management in New Zealand

New Zealand's fisheries resources in the territorial sea and the wider Exclusive Economic Zone (EEZ) are managed under the Fisheries Act and the Treaty of Waitangi Settlement Act. The Fisheries Act embodies the concepts of sustainable utilisation of our fisheries resource 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, the Marine Mammals Protection Act, the Marine Reserves Act, and the Resource Management Act. The main environmental impacts are managed under the Fisheries Act. This allows for the resource to be utilised within the limits of ensuring for utilisation of the resources by future generations.

The Quota Management System (QMS) sets the harvest levels of fish species within the EEZ and the Territorial Sea. The main provisions of the QMS are to maintain fisheries at a sustainable level through the Total Allowable Catch (TAC), to allocate that TAC to sectors, allocate the commercial allocation to commercial stakeholders, to 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 being 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, 83.2 percent of New Zealand's fish stocks are at a healthy status. 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 targets for 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 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

Approximately 450,000 tonnes of wild fish are sustainably harvested each year through the Quota Management System (QMS). The export value of this harvest ranges from $1.2 to $1.5 billion per annum. In addition to this, the aquaculture industry contributes about $350 million per annum. There are 1,178 commercial fishing vessels registered in New Zealand, and 239 licensed fish receivers and processors.[2]

In the 2014 year – the latest year available - there were 309 enterprises engaged in the Fish Trawling, Seining and Netting industry, 348 in the Line Fishing industry, 366 in Other Fishing enterprises, and 246 enterprises in the Rock Lobster and Crab Potting industry. In the 2014 year there were 132 business units in the Seafood Processing industry.

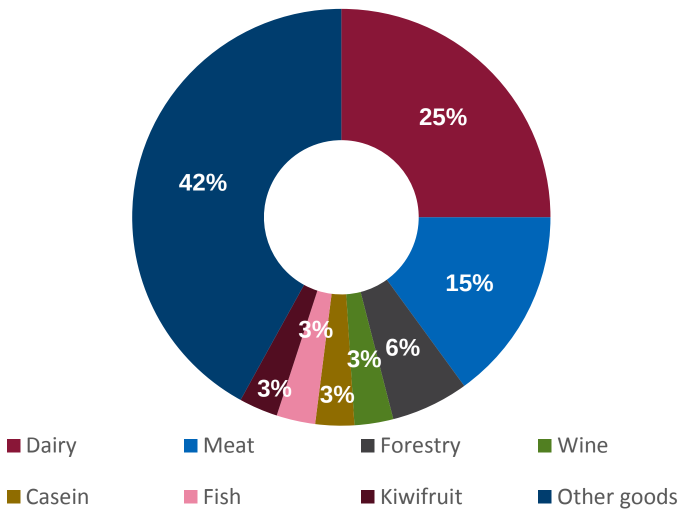
Some 2,200 individuals and companies now own quota as part of the QMS, and this quota is estimated to be worth $3.5 billion. Companies or organisations with large quota ownership in inshore finfish stocks include Te Ohu Kai Moana Trustee Limited, Sanford Limited, Aotearoa Fisheries Limited, Sealord Limited, Talley's Fisheries Limited and Ngai Tahu Fisheries Settlement Limited.

Today the interests of the fishing industry - including rock lobster, paua, deepwater, aquaculture and inshore finfish - are represented by Sector Representative Entities (SREs).[3] Fisheries Inshore New Zealand 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 March 2016 year, fish exports at $1.5 billion are New Zealand's fifth largest export commodity by value. This represents 3.2% of total exports of $46.6 billion, as shown in Figure 1 below. Of this $205 million are exports of frozen Hoki and $302 million are exports of live rock lobster. Processed seafood makes up a substantial proportion of our fish exports.

Figure 1 Exports, selected merchandise, year to March 2016



Source: *Statistics* New Zealand

[2] For further information see, www.fishserve.co.nz.

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

3 Methodology

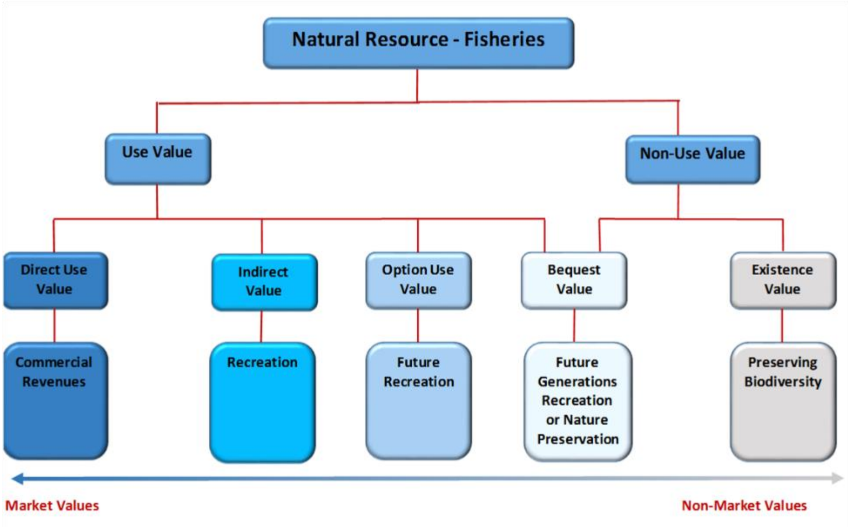
In this chapter we present the conceptual framework and empirical methodology used to estimate the economic contribution of commercial fishing to the New Zealand economy. We compare our methodology to those for previous studies, to explain differences in methods that produce different results.

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 economic 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 the suite of the total economic value of a fishery resource, as shown in Figure 2.

Figure 2 Total economic value of a fisheries resource



In general, the total economic value of a natural resource is comprised of:

- 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.[4]

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:[5]

- 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, Gross Domestic Product, 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: (i) Fish Trawling Seining and Netting; (ii) Line Fishing; (iii) Other Fishing; (iv) Rock Lobster and Crab Potting; and (v) 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, such as Ship Building and Repairs, and in more distantly related firms, such as in Road Transportation.

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

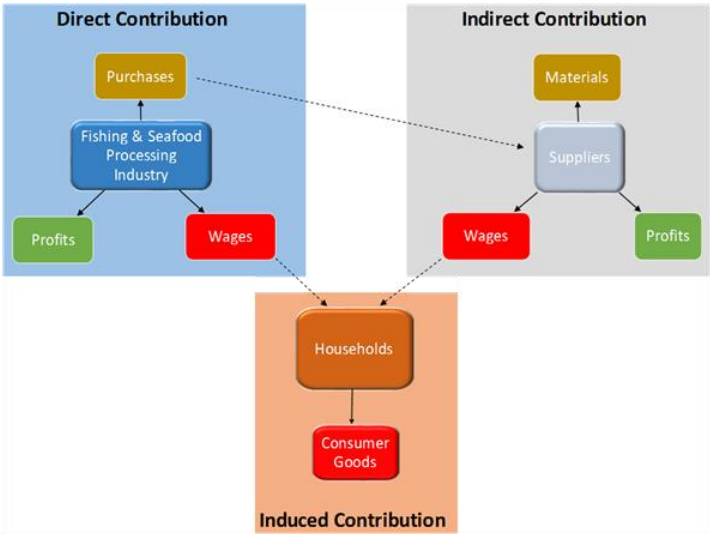
- profits from commercial fishing
- remuneration paid to fishing company employees

[4] SACES. (1999).

[5] GSGislason (2007).

- 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 Economic contribution of the Fishing and Seafood Processing industry



3.3 Measuring economic contribution

We use multiplier analysis using multipliers derived from inter-industry input-output tables to estimate the total impact on GDP and employment of an initial direct impact to the economy. Multipliers allow us to identify the direct, indirect and induced effects of additional activity or expenditure in terms of output (GDP) and full-time equivalent (FTE) employment.

3.3.1 Measures

Gross Output Multipliers

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.

Value Added (GDP) Multipliers

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.

Employment Impact Multipliers

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.

3.3.2 Overview of output calculation

We calculated the output values of the catch for use with the input-output multipliers. Our method is fully explained in chapter 5. In summary:

- MPI commercial catch data by greenweight (kg) is assembled by species, FMA, method and sector[6]. Such data in aggregate have a weight less than the total of all commercial catch because in creating the database, some data are omitted, since they do not satisfy all subgroups
- greenweight data are scaled up to reconcile with the total catch greenweight
- output value (catch value) corresponding to the fishing sector is calculated by multiplying port process by greenweight
- output value (catch value) corresponding to the seafood processing sector is calculated by multiplying export prices
- output value (catch value) corresponding to the combined fishing and seafood processing sector is calculated using revised multipliers to account for the overlap between the two constituent sectors.

3.3.3 Impacts

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

[6] The four sectors are: deepwater, highly migratory species, inshore, and shellfish. In addition, Rock Lobster and selected species such as Snapper and Paua are discussed in this report.

- 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. Where inputs or outputs come from outside the Taranaki region, leakages are said to exist, and the multiplier effect is reduced.

3.3.4 Limitations of multiplier analysis

Partial equilibrium 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.

Additionality

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.

Impact

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 countries borders.

Similarly, it would also be more accurate to determine a regional split where there is 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.

3.3.5 Industry multipliers

We have used the latest 2013 Input-Output tables produced by Statistics New Zealand in April 2016, to generate national level multipliers for the fishing and aquaculture, and the seafood processing industries, as shown in Table 1. Input-Output tables produced by Statistics New Zealand have 106 industries representing the total economy. This means that there is one multiplier industry that covers the entire fishing and aquaculture catching and harvesting industries. It was impractical for this project to develop individual multipliers for the fishing industry separately from the aquaculture industry. Hence we have used “fishing and aquculture” multipliers for “fishing only”

Table 1 Multipliers by industry

Multiplier Industry	Indirect	Induced	Total
Fishing and aquaculture			
Output	0.99	0.27	2.26
Value Added	1.46	0.50	2.96
Employment	1.52	0.49	3.01
Seafood processing			
Output	1.14	0.39	2.54
Value Added	1.35	0.61	2.96
Employment	1.46	0.60	3.07

The above multipliers were used to calculate our estimates for the national economic impact of the fishing and seafood processing industries separately. For our estimates of the combined economic value of the joint fishing and processing industries, we created overall multipliers for each of the calculations in the report. These were developed in a way that seeks to eliminate the impact of any double counting between the fishing and the seafood processing industries.

3.4 Prior Studies

In February 2016, the New Zealand Institute of Economic Research (NZIER, 2016) produced a report for the Ministry of Primary Industries on the *Economic impact of the seafood sector*. This report looked to update estimates of direct and flow-on impacts of the seafood sector (aquaculture, capture fishing and seafood processing) on the New Zealand economy and each regional council area. This report was for the 2013/14 year and updated an earlier report produced by Market Economics in 2008.

Our economic impact estimates are not directly comparable to those produced by NZIER, because of the following reasons:

- this report's estimate of direct output for the fishing sector is specifically designed to cover capture fishing and to exclude aquaculture (in either seafood processing or fishing and aquaculture industries). The NZIER report includes aquaculture in its estimates
- this report uses a five year average catch and value data, which covers the five years up to 2014/15. This means that we use different base data to the NZIER report which uses the 2013/14 year. This means that even if BERL included aquaculture estimates into our calculations, we would have different direct outputs for the fishing and seafood processing industries. i.e. BERL fishing output = $930 million, NZIER = $1,110 million. BERL Seafood processing output = $1,318 million, NZIER = $1,947 million

- the NZIER estimates were based on data for the seafood sector including both fishing and aquaculture obtained by the Department of Statistics Annual Enterprise Survey. The information is only available on an aggregate basis and cannot be disaggregated to sector or species outputs
- while the NZIER report was published in February 2016, a new 2013 version of the Input-Output Tables produced by Statistics New Zealand was released in April 2016. BERL is making use of the latest version of Statistics New Zealand Input-Output tables, while NZIER used the previous 2006 version of the Input-Output tables. As a result, multipliers for the fishing and seafood processing industries in our calculations are different to those used by NZIER. For example, NZIER have a type II multiplier for fishing and aquaculture output of 2.42, while for BERL the multiplier is now 2.26. That change would result in lower values for the BERL analysis when compared to the earlier NZIER analysis
- NZIER estimates do not account for the interdependency between the two industries when producing their overall seafood sector numbers. One of the main input industries into seafood processing is fishing and aquaculture, and one of the main output industries from fishing and aquaculture is seafood processing. This means that the individual total economic impacts for each industry (Output, Value added and Employment) overlaps those from the other industry. BERL has estimated that the approximate overlap between the industries is around 22 percent. We have therefore removed this portion when merging the industries into an overall estimate of the seafood sector to avoid double counting and therefore potentially inflating our estimate of the economic contribution.

While the results from both reports (Table 2) cannot be directly compared, the results from both of these reports can be used to provide an indicative check on the robustness of the results from each report.

Table 2 GDP for Seafood Sector, NZIER and BERL reports

	NZIER (incl Aquaculture)	BERL (excl Aquaculture)
Direct ($m)	896	555
Indirect ($m)	1,345	771
Induced ($m)	282	314
Total ($m)	**2,524**	**1,639**

4 The volume and value of the commercial catch

This section of our report discusses the commercial catch values from which the economic contribution of commercial fishing was estimated.

The commercial catch values for the economic contribution of the Fishing industry are based on port prices and catch volumes supplied by MPI. We have adjusted up the port prices and catch volumes 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 Annual Enterprise Survey of Statistics New Zealand. These methodologies are explained further below.

The commercial catch values for the economic contribution of the Seafood Processing industry are based on export volume, and a combination of port prices and export prices. These may be subject to some imprecision or uncertainty but accepted, in absence of any other information, to be indicative of relative value. Port prices are also accepted by the industry in respect of levy allocation between stocks. It would not be acceptable to use port prices to determine the value of the fishing industry, because export prices include value added by processing and marketing. Port prices are believed to be better indicators of revenue to the fishing industry, which catches and harvests the fish. Again, this methodology is explained in more detail below.

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, distance from shore, vessel length and 2014/15 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 2010 to September 2015. We therefore calculated a five year average to smooth out annual fluctuations.

4.2 Commercial catch volumes

The MPI data comprised about 92 percent of the total commercial catch data. This was a consequence of missing data at the level of detail we requested. By comparison, MPI report a higher aggregate catch volume when the data is segmented by fish stock and FMA only. We therefore adjusted our catch data to reconcile species totals with those reported by MPI.

To do this we adjusted our total catch per year to match: (i) the total reported commercial catch per year for these species and (ii), the total reported commercial catch numbers for each fishing year for 16 of the main species caught in New Zealand. These 16 species are: Hoki, Snapper, Ling, Arrow Squid, Southern Blue Whiting, Orange Roughy, Tarakihi, Flatfish, Jack Mackerel, Southern Bluefin Tuna, Barracouta, SkipJack Tuna, Blue Mackerel, Silver Warehou, Hake and Spiny Red Rock Lobster.

These 16 species represented around 80 percent of the total catch across the five fishing years. For example, as a result of the adjustment, the largest catch species Hoki went from a reported catch in our detailed dataset of 156.78 million kilograms in the 2014/15 fishing year to an adjusted total catch of 161.53 million kilograms in the 2014/15 fishing year.

For the remaining fish species, we prorated the balance of the total reported catch to their respective proportions. For example, Red Cod had a reported catch in the 2014/15 fishing year of 3.19 million kilograms in the initial dataset. This represented 4.2 percent of the remaining fish catch after the 16 main species were removed. This percentage was then multiplied by 82.35 million kilograms, being the balance in 2014/15 data after the 16 main species were removed. Consequently, the adjusted total for Red Cod in the 2014/15 fishing year was 3.46 million kilograms.

Overall these adjustments raised the total average catch over the five fishing years from 400.79 million kilograms to 434.34 million kilograms.

4.3 Commercial catch volumes by FMA

Table 3 shows the distribution of the adjusted catch by FMA. A map showing the FMAs is provided in Appendix B. In total across all 10 FMAs an average of 434.3 million kilograms of fish is caught annually.

FMA 7 Challenger had the largest average catch of 103.6 million kilograms over the five years analysed. The second largest catch was in FMA 3 South East Coast, with 66.7 million kilograms, and the third was FMA 6 Sub-Antarctic with 60.4 million kilograms. These three FMAs are fished from South Island ports.

The largest catch volume for a North Island FMA is the 39.1 million kilograms caught in FMA 1 Auckland East.

Table 3 Commercial catch volume by FMA

Fishing Management Area	Total Commercial Fish Catch (tonnes)					
	2010-11	2011-12	2012-13	2013-14	2014-15	Average
1 Auckland East	37,829	37,103	39,248	38,275	43,298	39,150
2 Central East	27,887	26,593	31,056	30,665	31,388	29,518
3 South East Coast	70,767	65,532	68,385	65,800	62,968	66,691
4 South East Chatham Rise	38,783	45,623	38,734	43,153	48,244	42,907
5 Southland	49,092	56,354	52,851	43,943	45,098	49,468
6 Sub-Antarctic	71,858	60,545	58,087	59,386	52,477	60,471
7 Challenger	86,758	96,844	97,002	115,105	122,479	103,638
8 Central West	24,835	25,528	26,854	24,594	18,068	23,976
9 Auckland West	18,516	17,554	18,844	16,433	21,150	18,499
10 Kermadec	43	24	0	10	16	19
Grand Total	426,369	431,699	431,061	437,365	445,187	434,336

Source: Ministry for Primary Industries

4.4 Commercial catch values by FMA

Port prices paid by licenced fish receivers in the 2014/15 fishing season were used to estimate the value of the adjusted fish catch. This value is an estimate of the revenue of the Fishing industry for the detailed segments of the dataset.

These detailed values were then aggregated by the four groups (also referred to as "methods" of fishing later in this report) within the Fishing industry: (i) Trawling, Seining and Netting; (ii) Line Fishing; Other Fishing; and Rock Lobster and Crab Potting. The detailed values making up each aggregate value was then adjusted so that the aggregate reconciled with the corresponding values for the same industries, as reported in the Annual Enterprise Survey (AES) of Statistics New Zealand.

Only information on total revenue and total expenditure is available from the AES. More detailed information on the make-up of the revenue and expenditure is available at the "division" level of the AES. However, at this higher level of aggregation, all the fishing industries are merged. In addition they are merged with aquaculture industries and we have exclude aquaculture from our analysis.

Overall this industry value adjustment sees the average value of the commercial fish catch increase from our initial estimate of $646.2 million to $929.8 million, as shown in Table 4.

Table 4 Commercial catch value (adjusted by FMA)

Fishing Management Area	Estimated value of fish ($millions)					
	2010-11	2011-12	2012-13	2013-14	2014-15	Average
1 Auckland East	138.5	149.9	152.3	145.4	128.5	142.9
2 Central East	104.6	96.0	107.9	108.7	103.4	104.1
3 South East Coast	114.3	110.9	112.7	107.5	110.0	111.1
4 South East Chatham Rise	108.5	118.5	109.8	122.7	123.6	116.6
5 Southland	144.7	158.4	154.1	138.6	136.2	146.4
6 Sub-Antarctic	88.0	74.2	68.8	71.7	62.7	73.1
7 Challenger	148.5	168.7	160.8	177.2	183.0	167.6
8 Central West	23.3	22.9	24.2	23.1	18.9	22.5
9 Auckland West	43.1	44.3	46.7	44.7	47.6	45.3
10 Kermadec	0.3	0.2	0.0	0.1	0.1	0.1
Grand Total	913.8	944.1	937.3	939.7	914.0	929.8

FMA 7 Challenger continues to have the largest average catch value, at $167.7 million over the five year period. The second largest catch is in FMA 5 Southland, at $146.4 million and the third is FMA 1 Auckland East, at $142.9 million. Again, this is the largest catch value for a North Island FMA.

4.5 The value of outputs from the Seafood Processing industry

The output values from the Seafood Processing industry are likely to reflect export prices rather than port prices. Export volume and value data for the 2013, 2014 and 2015 years were provided by Seafood New Zealand, which sourced the data from Statistics New Zealand.

These data showed the average export volume and average export price per kilogram for 50 species. These 50 species included Hoki, Snapper, Rock Lobster and others that represent approximately 80 percent of the total commercial catch. For example, this dataset showed that around 90 percent of the Hoki caught annually is exported. It also showed that the average price per kilogram for exported Hoki in 2015 was 2.4 times the 2014/15 port price.

As part of our calculations to determine the average export price per kilogram, we converted the export weights to greenweight. This allowed us to assess and compare the price per kilogram across the different export products on the same basis.

Of the 50 species, only four species had less than 10 percent of their annual total catch exported. Of the remaining 46 species, another five species had between 10 and 20 percent of their total annual catch exported, and 33 species had more than 50 percent of their total annual catch exported. On average across these 50 species, the export price was around 170 percent higher than the port price.

We estimated a price per kilogram in order to estimate the Seafood Processing output value. To do this we assumed:

- for the 46 fish species that had more than 10 percent of their total catch exported, every kilogram caught per year would attract the export price when sold by the Seafood Processing industry, irrespective of it being exported
- all other species attracted a mark-up of 150 percent on their port price, given that the 50 species had an average mark up of 170 percent when exported, irrespective of it being exported.

National aggregates of data provided by the AES are not useful in this study. This is because the AES revenue data for seafood processing includes revenue for the aquaculture industry that is not identifiable. At best we can use the total revenue data from the AES as a guide as to the maximum value of the Seafood Processing industry dealing with the fishing industries. In the 2014/15 fishing year, the Seafood Processing industry in total had an annual revenue of $1.9 billion.

4.5.1 Deepwater and inshore fishing catch volumes and values

Across the deepwater and inshore fisheries, there are four sectors: Highly Migratory Species (HMS), deepwater, inshore, and shellfish. There are a variety of species of fish that comprise these sectors. To provide an understanding on the main species of fish that are included in each sector, we provide Tables 5,6,7, and 8 for the average catch volumes and values, for the five years to 2015.

Rock lobster is comprised entirely of three species of rock lobster, the spiny red rock lobster, packhorse rock lobster, and the Spanish lobster. Of these three species, the spiny red rock lobster is worth $130.5 million a year on average, while the packhorse rock lobster is worth $1.2m a year on average, and Spanish lobster has an insignificant value. This shows that the spiny red rock lobster comprises 99 percent of the overall value of the fishery by itself.

As shown in Table 5, the top commercial fish species for deepwater fishing is Hoki, followed by Ling and Arrow Squid. The annual catch of these three species is worth more than $40 million to the Fishing industry. The bulk of the value of the deepwater fishery is tied to its three main species, in particular Hoki. This fish by itself accounts for 39 percent of the deepwater fisheries value, despite having an annual average catch of 137.7 thousand tonnes, or 47 percent of the total catch of the fishery.

The top 10 fish species account for 94 percent of the total value of the deepwater fishery, and 85 percent of the volume of the commercial catch.

Table 5 Catch and value of deepwater commercial catch, 2010-2015

Fish Species	Total Commercial Deepwater Fish Catch Average (2010-2015)	Estimated value of fish ($millions) Average (2010-2015)
Hoki	137,672	145.9
Ling	13,125	52.2
Arrow Squid	25,702	43.7
Southern Blue Whiting	33,175	26.1
Orange Roughy	6,603	22.4
Oreo	13,590	17.0
Scampi	814	16.3
Hake	6,807	11.0
Silver Warehou	8,168	9.1
Alfonsio	2,873	8.8
Sub Total	**248,529**	**352.5**
Other Fish species	55,000	30.7
Grand Total	**303,129**	**383.2**

Source: Ministry for Primary Industries & BERL

As shown in Table 6, the top commercial fish species for inshore fishing is Snapper followed by Blue Cod and Tarakihi. The annual catch of these three species is worth more than $20 million to the Fishing industry.

The top 10 fish species account for 75 percent of the total value of the inshore finfish (excludes Rock Lobster) fishery, but only 53 percent of the volume of the commercial catch. The bulk of the value of the inshore finfish fishery is tied to its three main species, in particular Snapper. This fish by itself accounts for 23 percent of the inshore finfish fisheries value, despite having an annual average catch of just 6.3 million kilograms.

Table 6 Catch and value of inshore finfish and rock lobster commercial catch, 2010-2015

Fish Species	Total Commercial Inshore Catch (tonne) Average (2010-2015)	Estimated value of fish ($millions) Average (2010-2015)
Snapper	6,342	61.8
Blue Cod	2,376	33.1
Tarakihi	5,701	22.8
Flatfish	2,652	19.9
Bluenose	1,319	12.8
Hapuku & Bass	1,440	12.3
Gurnard	4,049	11.3
John Mackerel	25,036	11.0
School Shark	3,008	10.9
Trevally	3,736	8.5
Sub Total	**55,659**	**204.4**
Other Fish species	54,000	201.1
Rock Lobster	2,837	131.6
Grand Total	**109,335**	**405.5**

Source: Ministry for Primary Industries & BERL

As shown in Table 7, the top commercial fish species within HMS fishing is Southern Bluefin Tuna, followed by SkipJack Tuna and Swordfish. The annual catch of these three species is worth more than $5 million to the Fishing industry.

The top 10 fish species account for almost 100 percent of the total value of the HMS fishery, and 99 percent of the volume of the commercial catch. The bulk of the value of the HMS fishery is tied to its three main species, in particular Southern Bluefin Tuna. This fish accounts for 41 percent of the HMS fisheries value, despite having an annual average catch of just 766,000 kilograms.

Table 7 Catch and value of Highly Migratory Species (HMS) commercial catch, 2010-2015

Fish Species	Total Commercial HMS Fish Catch (tonne) Average (2010-2015)	Estimated value of fish ($millions) Average (2010-2015)
Southern Bluefin Tuna	766	15.4
SkipJack Tuna	12,021	8.7
Swordfish	744	6.4
Bigeye Tuna	139	4.0
Pacific Bluefind Tuna	18	1.1
Albacore Tuna	273	1.0
Ray's Bream	280	0.5
Blue Shark	1,482	0.3
Moonfish	71	0.2
Slender Tuna	209	0.2
Sub Total	**16,003**	**37.8**
Other HMS species	360	0.3
Grand Total	**16,367**	**38.1**

Source: Ministry for Primary Industries & BERL

As shown in Table 8, Paua is the top commercial fish species within Shellfish, followed by Scallops and Kina. All three of these species have an annual catch worth more than $5 million each to the Fishing industry. There are just six species consistently caught in this fishery, with just 1,000 kilograms of other shellfish caught annually. The bulk of the value of the shellfish fishery is tied to Paua and Scallops. These shellfish account for 88 percent of the shellfish fisheries value, with an average annual catch of 1.7 million kilograms

Table 8 Catch and value of Shellfish commercial catch, 2010-2015

Fish Species	Total Commercial Shellfish Catch (tonne) Average (2010-2015)	Estimated value of fish ($millions) Average (2010-2015)
Paua	1,063	56.9
Scallops	632	32.3
Kina	967	6.8
Cockles	1,570	4.9
Paddle Crab	364	0.6
Sea Cucumber	130	0.5
Sub Total	**4,726**	**102.1**
Other shellfish species	780	0.9
Grand Total	**5,505**	**103.0**

Source: Ministry for Primary Industries & BERL

5 The economic contribution of commercial fishing

The total economic contribution of commercial fishing, comprised of fishing and seafood processing, in New Zealand was $1.6 billion in 2015, and was responsible for the employment of 13,730 FTEs.

Table 9 Economic contribution of commercial fishing, 2015

Sector	Measure	Direct	Indirect	Induced	Total
Deepwater (excl HMS)	Output (2015$m)	738.1	796.4	252.8	1,787.2
	GDP (2015$m)	232.8	323.3	131.9	688.1
	Employment (FTEs)	1,839	2,835	1,085	5,759
HMS	Output (2015$m)	71.2	76.6	24.2	172.0
	GDP (2015$m)	22.4	31.1	12.6	66.1
	Employment (FTEs)	178	273	104	554
Inshore (Finfish only)	Output (2015$m)	497.0	533.7	168.1	1,198.8
	GDP (2015$m)	155.8	216.9	87.7	460.5
	Employment (FTEs)	1,245	1,901	721	3,867
Shellfish	Output (2015$m)	129.4	134.0	39.6	302.9
	GDP (2015$m)	38.7	55.0	20.6	114.3
	Employment (FTEs)	338	478	170	986
Rock Lobster	Output (2015$m)	325.3	356.8	116.4	798.5
	GDP (2015$m)	104.9	144.3	60.7	309.9
	Employment (FTEs)	794	1,270	499	2,563
Grand Total	**Output (2015$m)**	**1,761.0**	**1,897.5**	**601.0**	**4,259.5**
	GDP (2015$m)	**554**	**771**	**314**	**1,639**
	Employment (FTEs)	**4,394**	**6,756**	**2,579**	**13,730**

In summary, deepwater and inshore (Finfish and Rock Lobster) fishing have similar impacts on national GDP. Within the Inshore sector, Finfish contributes about 52 percent of the impact of this sector, with Rock Lobster making up about 35 percent, and Shellfish 13 percent. Paua contributes about 52 percent of the direct output of the Shellfish sector. Snapper meanwhile contributes about 19 percent of the Finfish industry. These results show the potential consequences on New Zealand's GDP from any reduction in total allowable commercial catch for inshore fishing, particularly for Rock Lobster, Snapper, and Paua.

The following section breaks down our estimates of the economic contribution of commercial fishing. This analysis focuses on:

- the Fishing industry, which catches the 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; Highly migratory species; and Shellfish
- fishing method - Fish Trawling, Seining and Netting; Line Fishing; Other Fishing; and Rock Lobster and Crab Potting
- FMA – geographic marine locations
- Regions[7] – geographic land-based locations, where the Hawke's Bay and Gisborne regions are grouped together as are Nelson, Tasman and Marlborough
- average annual catches, unless otherwise stated, the results we provide are averages of annual data for the five fishing seasons covering the period October 2010 to September 2015.

Standard multiplier analysis techniques are used to determine the direct, indirect and induced economic contributions for outputs (gross revenue), GDP (value added) and employment.[8] Output values underpin the multiplier analysis and are derived from commercial catch values by FMA, fishing method and main species.

5.1 The economic contribution, fishing, seafood processing, and combined

Over the last five fishing seasons, on average, the fishing industry (harvesting of fish only) earned $929.8 million in gross revenue and directly employed approximately 2,544 full-time equivalents (FTEs).[9] This means that the Fishing industry contributed a total of $776.4 million in GDP to the New Zealand economy, and employed approximately 7,652 FTEs. A detailed breakdown of this economic impact by FMA is shown in Appendix C.

Table 10 Economic contribution of the Fishing industry

	Direct	Indirect	Induced	Total
Output (2015$m)	929.8	923.5	250.9	2,104.2
GDP (2015$m)	262.6	382.8	131.0	776.4
Employment (FTEs)	2,544	3,860	1,248	7,652

[7] It is not possible to reconcile the FMAs and the regions since one is marine -based and the other is land-based.

[8] Further information on this analysis is provided in the Appendix.

[9] A full-time equivalent is defined differently to a count of a person employed and so the employment numbers here differ from the Annual LEED data, even though they are derived from the same database.

The Seafood Processing industry (processing of fish only) purchases raw fish and seafood from the Fishing industry. It then adds value by processing these raw products for export or domestic consumption. Over the last five fishing seasons, on average, the Seafood Processing industry earned a gross revenue of $1.3 billion and employed approximately 3,051 FTEs. A detailed breakdown of this economic impact by FMA is shown in Appendix D. This industry has a slightly larger direct impact on the New Zealand economy than the Fishing industry, as shown in Table 11.

Table 11 Economic contribution of the Seafood Processing industry

	Direct	Indirect	Induced	Total
Output (2015$m)	1,318.4	1,504.0	520.6	3,343.0
GDP (2015$m)	447.2	602.6	271.8	1,321.5
Employment (FTEs)	3,051	4,466	1,839	9,356

We estimate that the Seafood Processing industry (excluding aquaculture processing) had a total economic contribution of $1.3 billion in GDP and impacted on the employment of 9,356 FTEs.

A large amount of seafood processing occurs in land-based factories. Annual LEED employment data was therefore 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.

The three regional council areas with the most workers and the most revenue, are Canterbury with an average of $393 million in revenue (or 30 percent); Nelson-Tasman-Marlborough with $366.7 million; and Auckland with $190.5 million. Combined these three regional councils generated $950.2 million or around 72 percent of the overall estimated revenue of the Seafood Processing industry.

There is a high degree of dependency between the Fishing and the Seafood Processing industries. The fishing industry provides the raw products for processing, and relies on the Seafood Processing industry to purchase its harvest. A number of New Zealand companies operate in both of these sectors because of this high degree of dependency. This allows them to exploit synergies in their fishing, processing and marketing.

This high dependency also has implications in terms of estimates of economic contributions. In particular, the overall economic contribution of these two sectors combined needs to account for the overlap between them, where the output of one industry is an input into the other.

For example, the total impact of the Seafood Processing industry, at $1.3 billion in GDP, is comprised of $447.2 million generated directly by it (a direct impact), $602.6 million in GDP generated by industries that supply it (an indirect impact), of which the fishing industry is the largest, and $271.8 million in GDP generated from purchases of households comprised of employees of the Seafood Processing industry and other industries (an induced impact).

This means that we cannot simply add together the total economic contribution of both of these sectors, as that would double count some of the output, GDP and employment generated by the Fishing industry.

To account for this overlap, we have treated the two industries as a single industry. In this way our multiplier methodology, using the input-output tables generated by Statistics New Zealand, allows us to eliminate the double-counted economic impact that would otherwise have resulted.

As shown in Table 12, in the five years to 2013, on average, the combined Fishing and Seafood Processing industry contributed a direct output of $1.76 billion, $554.5 million in GDP and employment of 4,394 FTEs.

Table 12 Economic contribution of combined Fishing & Seafood Processing

	Direct	Indirect	Induced	Total
Output (2015$m)	1,761.0	1,897.5	601.0	4,259.5
GDP (2015$m)	554.5	770.7	313.7	1,638.9
Employment (FTEs)	4,394	6,756	2,579	13,730

Using multiplier analysis we estimate that this combined industry contributes an estimated $1.64 billion in GDP to the New Zealand economy, and supports the employment of 13,730 FTEs.

5.2 The economic contribution by fishing sector

The main deepwater fish species caught in New Zealand are Hoki, Ling, Arrow Squid and Southern Blue Whiting. Inshore the main species caught are Rock Lobster, Snapper and Blue Cod. Shellfish are inshore molluscs, and our main shellfish species is Paua.

Deepwater fish are caught at lower depths, which are generally found in New Zealand beyond 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 more shallow waters. A small proportion of all fish harvested migrate between these two areas.

Overall gross revenue from both the Fishing and Seafood Processing industries are fairly equally split across inshore and deepwater fishing. Inshore fishing is estimated to generate 55 percent of the revenue from the Fishing industry and 54 percent of the revenue from Seafood Processing.

5.2.1 The economic contribution of deepwater fishing

Table 13 shows that in the five years to 2015, on average, the share for deepwater fishing, of the combined fishing and seafood sector's total economic contribution to the New Zealand economy, was made up by output of $1,787.2 million, GDP of $688.1 million and employment of 5,759 FTEs.

Table 13 Economic contribution of deepwater fishing

	Direct	Indirect	Induced	Total
Output (2015$m)	738.1	796.4	252.8	1,787.2
GDP (2015$m)	232.8	323.3	131.9	688.1
Employment (FTEs)	1,839	2,835	1,085	5,759

5.2.2 The economic contribution of highly migratory species fishing

Table 14 shows that in the five years to 2015, on average, the share for highly migratory species, of the combined Fishing and Seafood Processing industry's total economic contribution to the New Zealand economy, was made up by output of $172 million, GDP of $66.1 million and employment of 554 FTEs.

Table 14 Economic contribution of Highly Migratory Species (HMS)

	Direct	Indirect	Induced	Total
Output (2015$m)	71.2	76.6	24.2	172.0
GDP (2015$m)	22.4	31.1	12.6	66.1
Employment (FTEs)	178	273	104	554

5.2.3 The economic contribution of inshore fishing

Table 15 shows that in the five years to 2015, on average, the share for inshore species, of the combined Fishing and Seafood Processing industry's total economic contribution to the New Zealand economy, was made up by output of $2,300.3 million, GDP of $884.7 million and employment of 7,416 FTEs.

Table 15 Economic contribution of inshore fishing

	Direct	Indirect	Induced	Total
Output (2015$m)	951.7	1,024.6	324.0	2,300.3
GDP (2015$m)	299.3	416.2	169.1	884.7
Employment (FTEs)	2,377	3,648	1,391	7,416

Table 16 shows that in the five years to 2015, on average, 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 by output of $1,198.8 million, GDP of $460.5 million and employment of 3,867 FTEs.

Table 16 Economic contribution of inshore fishing, Finfish

	Direct	Indirect	Induced	Total
Output (2015$m)	497.0	533.7	168.1	1,198.8
GDP (2015$m)	155.8	216.9	87.7	460.5
Employment (FTEs)	1,245	1,901	721	3,867

Snapper, Rock Lobster and Paua 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.

Table 17 shows that in the five years to 2015, on average, the share for inshore species that are Snapper, of the combined Fishing and Seafood Processing industry's total economic contribution to the New Zealand economy, was made up by output of $229.5 million, GDP of $87.6 million and employment of 743 FTEs.

Table 17 Economic contribution of inshore fishing, Snapper

	Direct	Indirect	Induced	Total
Output (2015$m)	96.2	101.9	31.4	229.5
GDP (2015$m)	29.6	41.6	16.4	87.6
Employment (FTEs)	245	363	135	743

Fishing Management Area 1 provides the largest source of commercially caught Snapper. On average over the last 5 years, 4,530 tonnes of Snapper was commercially caught in FMA1. This amounts to 71 percent of the total annual catch. In total this 4,530 tonnes of Snapper represents $68.7 million in direct gross output. The average gross output per kilogram of catch is therefore $15.20, which in turn directly generates $4.70 per kilogram in GDP.

As an indication of the impact on GDP of a reduction in Snapper catch in FMA 1, a 50 percent reduction of the 2,265 tonne catch will result in a loss of $34.36 million in direct output and a loss of $10.57 million in direct GDP.

Table 18 shows that in the five years to 2015, on average, the total economic contribution of Rock Lobster to the New Zealand economy was an estimated $309.9 million in GDP, and total employment of approximately 2,563 FTEs.

Table 18 Economic contribution of inshore fishing, Rock Lobster

	Direct	Indirect	Induced	Total
Output (2015$m)	325.3	356.8	116.4	798.5
GDP (2015$m)	104.9	144.3	60.7	309.9
Employment (FTEs)	794	1,270	499	2,563

The $325.3 million in total gross output comes from average annual catch of 2,837 tonnes of Rock Lobster. This means an average gross output of $114.70 per kilogram of catch, which in turn directly generates $37 per kilogram in GDP.

As an indication of the impact on GDP of a reduction in Rock Lobster catch, a reduction of 100 tonnes will result in a loss of $11.47 million in direct outputs, and a loss of $3.70 million in direct GDP.

5.2.4 The economic contribution of shellfish fishing

Table 9 (above) shows that in the five years to 2015, on average, the total economic contribution of shellfish to the New Zealand economy was an estimated $114 million in GDP and total employment of approximately 986 FTEs.

Table 19 below shows that in the five years to 2015, on average, the total economic contribution of shellfish was largely made up by Paua with an estimated $59.3 million in GDP and total employment of approximately 514 FTEs.

Table 19 Economic contribution of inshore fishing, Paua

	Direct	Indirect	Induced	Total
Output (2015$m)	67.8	69.7	20.3	157.7
GDP (2015$m)	20.1	28.6	10.6	59.3
Employment (FTEs)	179	248	87	514

5.3 The economic contribution by Fishing Method

In this section we present the total economic contribution for the combined Fishing and Seafood Processing industry by method, based on the average gross revenue across the five fishing seasons to 2015.

The largest of the four fishing industries is the Trawling, Seining and Netting Fishing industry. This industry averages $1,093.1 million per season in gross revenue or output. This is over five times as large as the next largest industry, Other 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. Hoki, Ling, Orange Roughy and Snapper are the most commonly caught fish in this industry.

As shown in Table 20, the Trawling, Seining and Netting Fishing industry causes the direct employment of an estimated 2,717 FTEs across Fishing and Seafood Processing and generates approximately $345.5 million in GDP. Using multiplier analysis, this industry in total contributes $1.02 billion in GDP and the employment of 8,537 FTEs throughout the New Zealand economy.

Table 20 Economic contribution of Trawling, Seining and Netting Fishing

	Direct	Indirect	Induced	Total
Output (2015$m)	1,093.1	1,181.4	376.1	2,650.5
GDP (2015$m)	345.5	479.5	196.3	1,021.3
Employment (FTEs)	2,717	4,206	1,614	8,537

The Line Fishing industry includes methods such as all bottom longline, hand line, dropline, squid jigging, surface longline, and troll fishing methods. Snapper and Ling are the two main species caught using Line Fishing. This industry averages $164.3 million in output per season. As shown in Table 21, the industry contributes a total of $149.4 million in GDP and 1,268 FTEs to the economy from the combined Fishing and Seafood Processing industry.

Table 21 Economic contribution of Line Fishing

	Direct	Indirect	Induced	Total
Output (2015$m)	164.3	174.0	53.5	391.8
GDP (2015$m)	50.6	71.0	27.9	149.4
Employment (FTEs)	419	620	230	1,268

Fishing methods used in the Other Fishing industry include catch by cod pots, octopus pots, hand gathering, fish traps, dredging, and diving. Blue Cod and Paua are the two main species commercially caught in this industry. This industry averages $192.3 million per season in total revenue or output.

As shown in Table 22 below, the Other Fishing Industry directly causes the employment of approximately 1,141 FTEs and generates approximately $84.3 million in GDP across its fishing and seafood processing activities. Using multiplier analysis, the total economic contribution of this industry is an estimated $199.2 million in GDP and the employment of approximately 2,206 FTEs throughout the New Zealand economy.

Table 22 Economic contribution of Other Fishing

	Direct	Indirect	Induced	Total
Output (2015$m)	192.3	170.5	80.4	443.2
GDP (2015$m)	84.3	72.9	42.0	199.2
Employment (FTEs)	1,141	719	345	2,206

The Rock Lobster and Crab Potting industry averages $323.0 million in output per season. As shown in Table 23, the Fishing and Seafood Processing economic contribution generated by this industry directly contributes $104.2 million in GDP and 787 FTEs. Because not all Rock Lobster is caught using Rock Lobster Pots, the output value of this group is lower than reported above for the economic contribution of the Fishing industry by species. Other catch methods are commercial diving and hand gathering, and in bycatch with set netting, fish traps, dredging etc.

The total economic contribution of the Rock Lobster and Crab Potting industry is an estimated $308 million in GDP and the employment of approximately 2,546 FTEs throughout New Zealand.

Table 23 Economic contribution of Rock Lobster and Crab Potting

	Direct	Indirect	Induced	Total
Output (2015$m)	323.0	354.5	115.8	793.2
GDP (2015$m)	104.2	143.3	60.4	308.0
Employment (FTEs)	787	1,262	497	2,546

6 Employment

Employment is a useful measure of economic impact, in addition to revenue and Gross Domestic Product, because it measures the impact of the activity by industry type and the location of the worker.[10] The following discussion focuses on employment in the Fishing sector[11] and its associated industries. This discussion is broken down by industry and regional council areas. Annual employment counts in the Fishing sector are for the March years from 2000 to 2014.

6.1 Employment in the Fishing sector

Employment in the Fishing sector is dominated in New Zealand by the Seafood Processing industry. Overall, the Fishing sector includes the following industries:

- Seafood Processing
- Fish Trawling, Seining and Netting
- Line Fishing
- Other Fishing
- Rock Lobster and Crab Potting
- Shipbuilding and Repair Services
- Fish and Seafood Wholesaling.

Between 2000 and 2014, the fishing sector has seen a slight decline in employment, from 11,919 people in 2000 to 10,734 people in 2014, as shown in Table 24.

Table 24 Employment in the Fishing sector, by industry, 2000-2014

Industries within the Fishing sector	2000	2005	2010	2014	Change between 2000 and 2014 (% per annum)
Shipbuilding and Repair Services	753	771	582	885	1.2%
Seafood Processing	6,951	7,026	5,883	5,928	-1.1%
Fish and Seafood Wholesaling	447	648	687	789	4.1%
Fish Trawling, Seining and Netting	2,088	1,800	1,773	1,692	-1.5%
Line Fishing	870	792	612	573	-2.9%
Other Fishing	225	219	375	468	5.4%
Rock Lobster and Crab Potting	585	441	402	399	-2.7%
Total Fishing sector	**11,919**	**11,697**	**10,314**	**10,734**	**-0.7%**

Source: Statistics New Zealand

[10] The data in this section is annual LEED data from Statistics New Zealand. This data is actual employment counts derived from the PAYE and IR3 taxation returns of individuals. The geographic location is defined as the location of the business unit where the individual is employed and so the data accurately reflects business activity for each location and not the residence of the individual for each location (as for other types of LEED data).

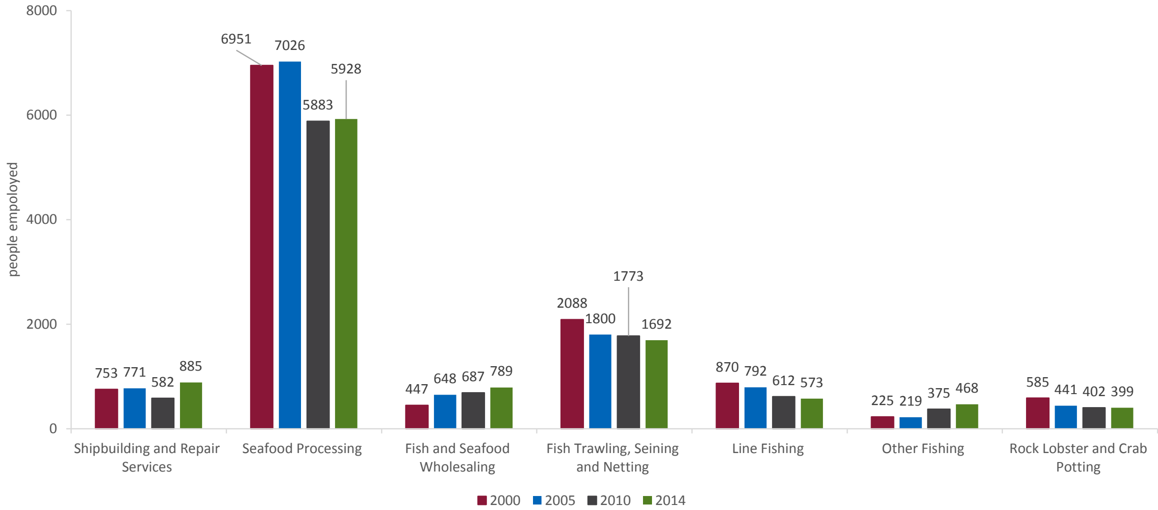
[11] In this chapter, the tem "sector" is used to means a collection of industries, rather than its use in previous chapters to recognise domains of fishing.

As shown in the table and in Figure 4, across the 14 year period, three of the seven industries have seen an overall increase in employment. These are Shipbuilding and Repair Services; Fish and Seafood Wholesaling; and Other Fishing. Other Fishing and Fish and Seafood Wholesaling have seen increases across the entire 14 year period, while Shipbuilding and Repair Services after a large drop in employment between 2005 and 2010, have seen a substantial rebound in employment numbers across the four years from 2010 to 2014.

Of the remaining four industries the largest decline in absolute employment has come from the Seafood Processing industry, which after seeing a small increase of around 70 people between 2000 and 2005, has seen almost 1,100 people leave the industry between 2005 and 2014. For the second largest industry, Fish Trawling, Seining and Netting, there has been a steady decline in employment numbers across the 14 year period. Employment numbers for this industry are down almost 400 between 2000 and 2014.

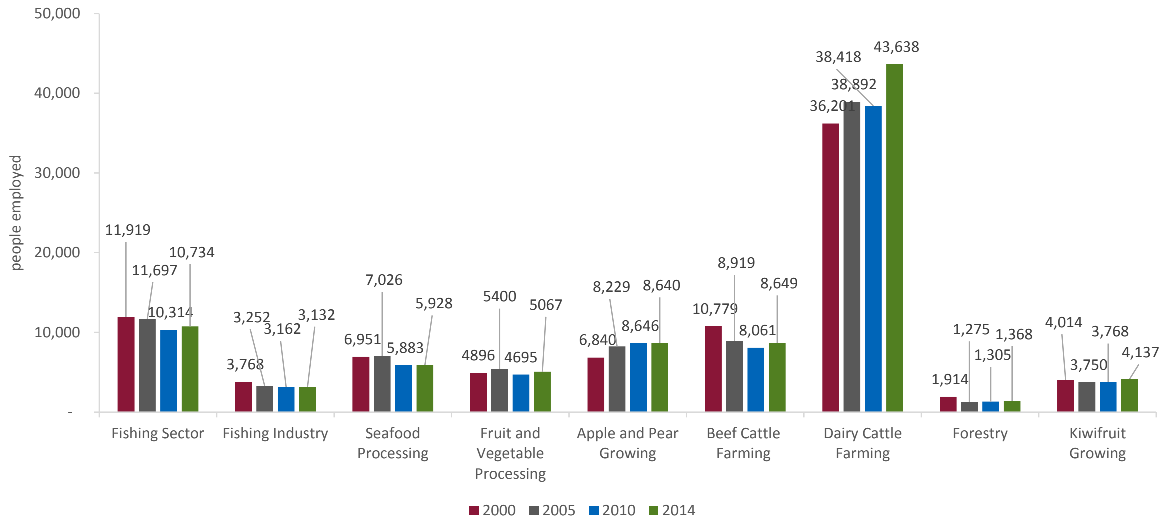
As shown in Figure 4, fishing sector employment is dominated by Seafood Processing (including on-vessel processing).

Figure 4 Fishing sector employment, New Zealand, 2000-2014



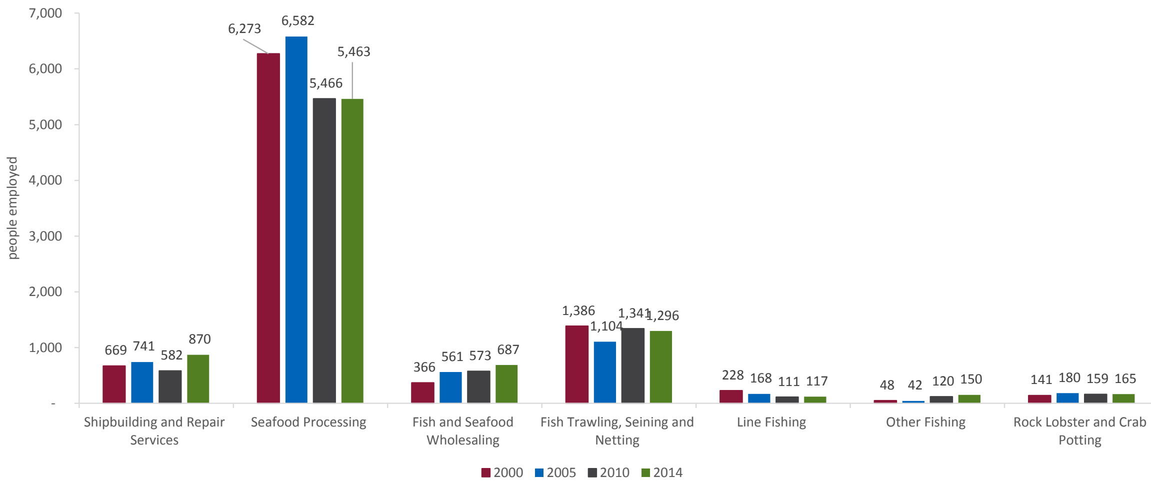
As a comparator, employment in the Fishing sector is similar in magnitude to that of Beef Cattle Farming. In turn, employment in the Seafood Processing industry is somewhat larger than employment in the Fruit and Vegetable Processing industry and similar in size to the Apple and Pear Growing industry.

Figure 5 Fishing sector employment compared to other industries, New Zealand, 2000-2014



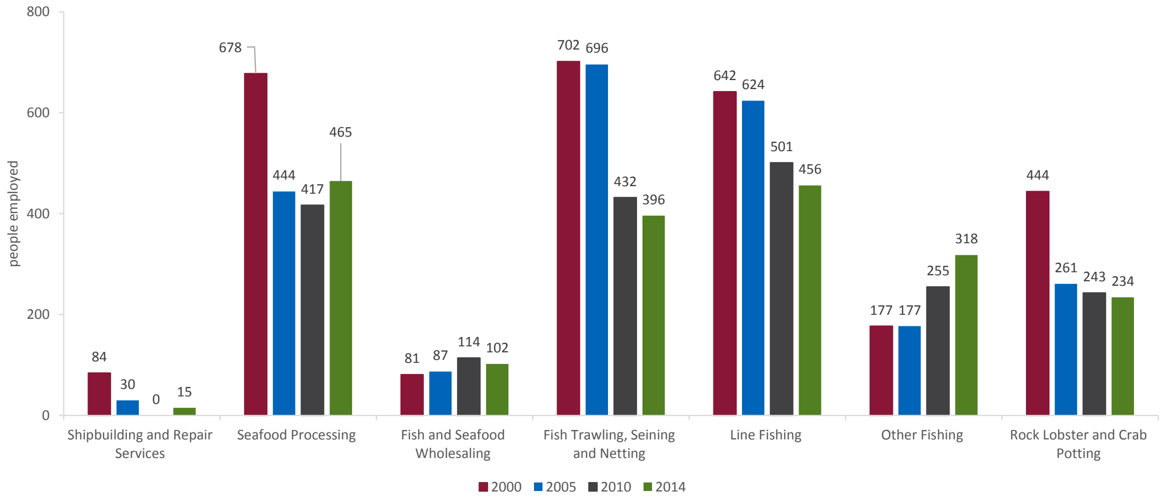
In wage and salary employment, numbers have fallen in Fish Trawling, Seining, and Netting and in Line Fishing. A noticeable feature of these two industries, and for Rock Lobster and Crab Potting, is that self-employment declines have been larger than for wage and salary employment. By comparison, Other Fishing employment has increased for both wage and salary employment and self-employment. This is consistent with a consolidation of businesses in these industries.

Figure 6 Fishing sector wage and salary employment, New Zealand, 2000-2014



Self-employment in Seafood Processing was 31 percent lower in 2014 compared to 2000. Again, this is consistent with consolidation and rationalisation of effort. Interestingly, Fish and Seafood Wholesaling employment has risen both for wage and salary workers and for self-employed workers. By comparison, wage and salary employment in Shipbuilding and Repair Services has increased since 2000.

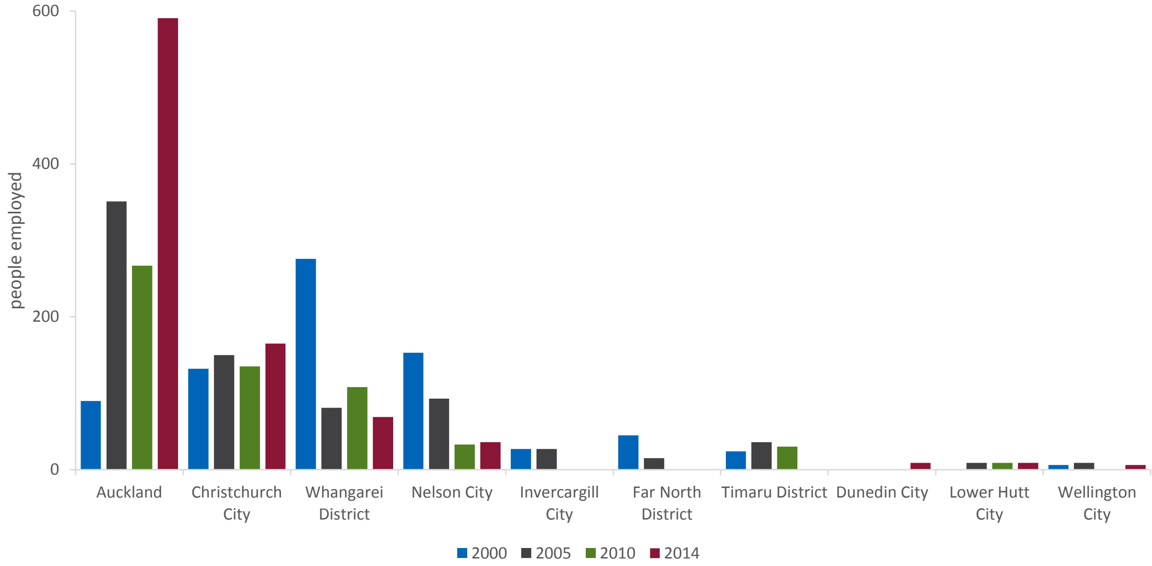
Figure 7 Fishing sector self-employment, New Zealand, 2000-2014



6.2 Employment changes by location

Across the fishing sector between 2000 and 2014, two industries have shown substantial changes in the location of employment in New Zealand. These two industries are Shipbuilding and Repair Services, and Seafood Processing. The 753 people employed in 2000 in Shipbuilding and Repair Services (Figure 8) have become more concentrated in urban areas between 2000 and 2014, shifting from regional locations. In 2000, employment was largely located in Whangarei (276 people employed), Nelson (153 people employed) and Christchurch (132 people employed). Interestingly, Invercargill, Far North District, and Timaru all had a small amount of employment in this industry in 2000, showing the rural location of the shipbuilding industry and the dominance of the Northland region (43 percent of total employment) in this industry. In 2014, the main employment numbers have concentrated in Auckland (591 people employed) and Christchurch (165 people employed) out of total employment in the industry of 885. In 2014, there were no people employed in this industry in Invercargill, Far North District, and Timaru.

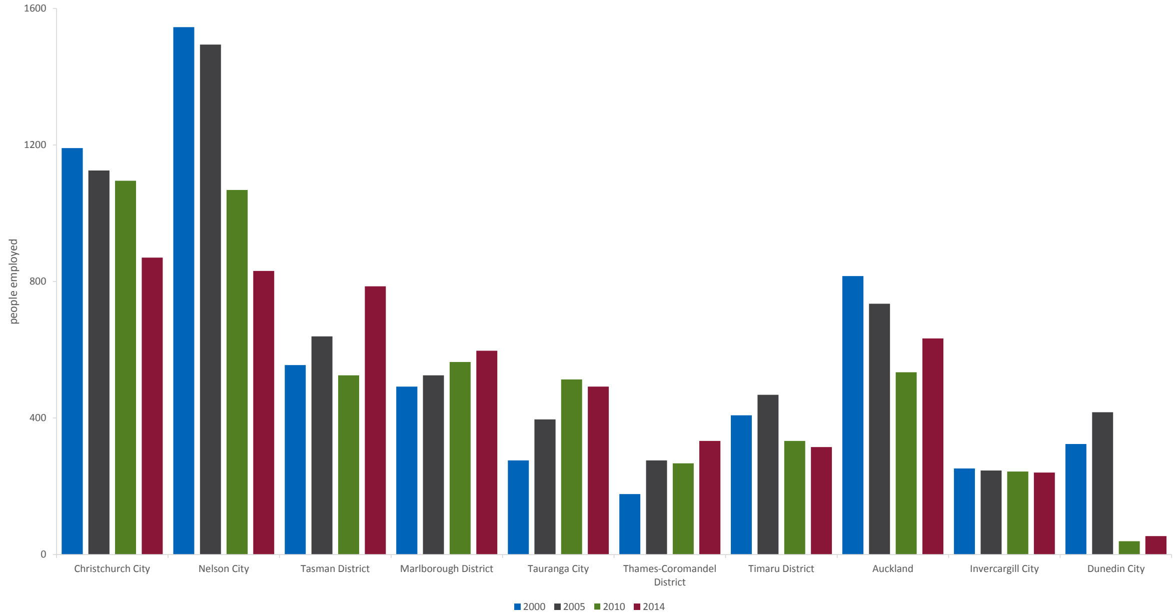
Figure 8 Shipbuilding and Repair employment by top 10 local authority, 2000 - 2014



The Seafood Processing Industry which employed 6,951 people in 2000 (Figure 9), has since 2000 shown a small number of large changes in employment by location. This has been due in large part to relocation of processing activity around New Zealand. In 2000, Nelson (1,545 people employed), Christchurch (1,191 people employed), and Auckland (816 people employed) had the largest number of people employed in the industry. These three areas employed just over half of all people employed in this industry.

From 2005 to 2014, employment in this industry has fallen from 7,026 to 5,928. Along with this fall in employment, the industry has seen employment moved out of the three dominant areas of Seafood Processing to other locations, which have seen the industries employment more evenly spread. This relocation of employment has seen rises in employment to 2014, in Tasman (786 people employed), Marlborough (597 people employed), Tauranga (492 people employed) and Thames-Coromandel (333 people employed). At the same time the employment has heavily fallen in Nelson (831 people employed in 2014), Auckland (633 people employed in 2014) and Christchurch (870 people employed in 2014.

Figure 9 Seafood Processing industry employment by top 10 local authority, 2000 – 2014



Appendix A Definitions of industry classifications

Fish Trawling, Seining and Netting

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

- 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.

Line Fishing

This class consists 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

- 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.

Rock Lobster and Crab Potting

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

- 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; and
- farming crustaceans in tanks or ponds onshore are included in Class 0203 Onshore Aquaculture.

Other Fishing

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

Primary activities

- Abalone/paua fishing
- Freshwater eel fishing
- Freshwater fishing n.e.c.
- Marine water fishery product gathering
- Oyster catching (except from cultivated oyster beds)
- Pearling (except pearl 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; and potting for rock lobster or crabs are included in Class 0411 Rock Lobster and Crab Potting.

Shipbuilding and Repair Services

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

- Drydock operation

- Hull cleaning
- Ship repairing
- Ship wrecking
- Shipbuilding
- Submarine constructing

Exclusions/References

Units mainly engaged in: building boats are included in Class 2392 Boatbuilding and Repair Services.

Fish and Seafood Wholesaling

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

Primary activities

- 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 classes of Group 041 Fishing;
- cleaning, cooking or freezing crustaceans or molluscs (including shelling and bottling oysters) or in freezing filleted fish (including whole fin fish) are included in Class 1120 Seafood Processing; wholesaling canned fish or seafood are included in Class 3609 Other Grocery Wholesaling; and wholesaling fish or seafood in conjunction with a wide variety of other grocery items are included in Class 3601 General Line Grocery Wholesaling.

Seafood Processing

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

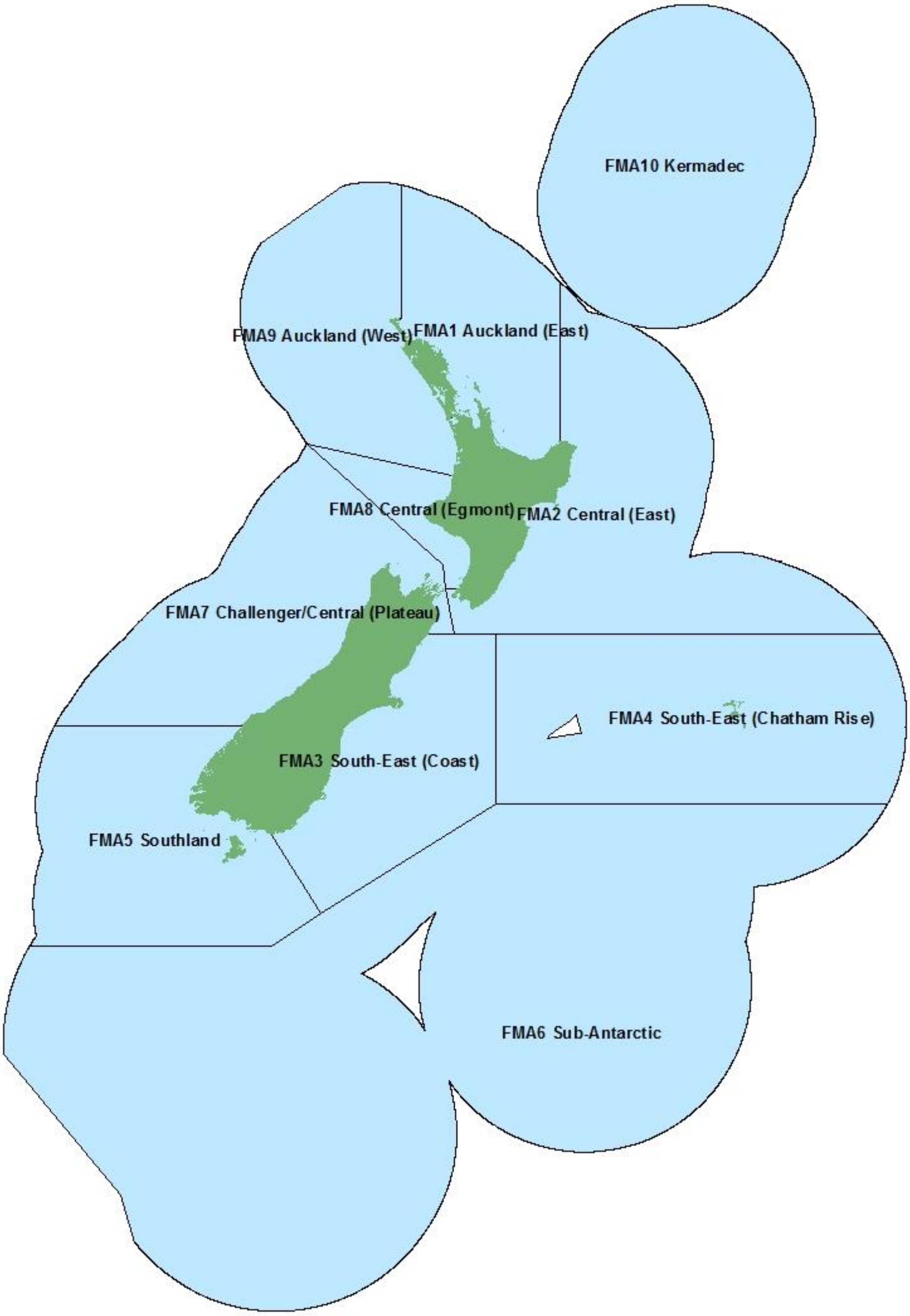
- Crustacean, processed, manufacturing (including cooked and/or frozen) n.e.c.
- Fish cleaning or filleting
- Fish fillet manufacturing
- Fish loaf or cake manufacturing
- Fish paste manufacturing
- Fish pate manufacturing
- Fish, canned, manufacturing

- 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 fin fish freezing

Exclusions/References

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

Appendix B Fishing Management Area (FMA) map



Appendix C Economic contribution (harvesting only) by FMA

Table 25 FMA1

	Direct	Indirect	Induced	Total
Output (2015$m)	130.8	129.9	35.3	295.9
GDP (2015$m)	36.9	53.8	18.4	109.2
Employment (FTEs)	462	700	226	1,388

Table 26 FMA2

	Direct	Indirect	Induced	Total
Output (2015$m)	105.2	104.5	28.4	238.0
GDP (2015$m)	29.7	43.3	14.8	87.8
Employment (FTEs)	205	310	100	615

Table 27 FMA3

	Direct	Indirect	Induced	Total
Output (2015$m)	111.9	111.2	30.2	253.3
GDP (2015$m)	31.6	46.1	15.8	93.5
Employment (FTEs)	299	453	147	899

Table 28 FMA4

	Direct	Indirect	Induced	Total
Output (2015$m)	125.7	124.9	33.9	284.5
GDP (2015$m)	35.5	51.8	17.7	105.0
Employment (FTEs)	82	124	40	246

Table 29 FMA5

	Direct	Indirect	Induced	Total
Output (2015$m)	138.6	137.6	37.4	313.6
GDP (2015$m)	39.1	57.1	19.5	115.7
Employment (FTEs)	141	214	69	424

Table 30 FMA6

	Direct	Indirect	Induced	Total
Output (2015$m)	63.8	63.3	17.2	144.3
GDP (2015$m)	18.0	26.3	9.0	53.2
Employment (FTEs)	195	297	96	588

Table 31 FMA7

	Direct	Indirect	Induced	Total
Output (2015$m)	186.2	184.9	50.2	421.3
GDP (2015$m)	52.6	76.7	26.2	155.5
Employment (FTEs)	966	1,465	474	2,905

Table 32 FMA8

	Direct	Indirect	Induced	Total
Output (2015$m)	19.2	19.1	5.2	43.5
GDP (2015$m)	5.4	7.9	2.7	16.0
Employment (FTEs)	73	110	36	219

Table 33 FMA9

	Direct	Indirect	Induced	Total
Output (2015$m)	48.4	48.1	13.1	109.6
GDP (2015$m)	13.7	19.9	6.8	40.5
Employment (FTEs)	122	186	60	368

Appendix D Economic contribution (processing only) by region

Regional contribution

Table 34 Northland

	Direct	Indirect	Induced	Total
Output (2015$m)	39.6	45.1	15.6	100.3
GDP (2015$m)	13.4	18.1	8.2	39.7
Employment (FTEs)	92	134	55	281

Table 35 Auckland

	Direct	Indirect	Induced	Total
Output (2015$m)	190.5	217.4	75.2	483.1
GDP (2015$m)	64.6	87.1	39.3	191.0
Employment (FTEs)	441	645	266	1,352

Table 36 Waikato

	Direct	Indirect	Induced	Total
Output (2015$m)	99.2	113.2	39.2	251.5
GDP (2015$m)	33.6	45.3	20.4	99.4
Employment (FTEs)	230	336	138	704

Table 37 Bay of Plenty

	Direct	Indirect	Induced	Total
Output (2015$m)	77.5	88.4	30.6	196.5
GDP (2015$m)	26.3	35.4	16.0	77.7
Employment (FTEs)	179	263	108	550

Table 38 Hawke's Bay - Gisborne

	Direct	Indirect	Induced	Total
Output (2015$m)	33.5	38.2	13.2	85.0
GDP (2015$m)	11.4	15.3	6.9	33.6
Employment (FTEs)	78	114	47	238

Table 39 Manawatu - Whanganui

	Direct	Indirect	Induced	Total
Output (2015$m)	13.7	15.6	5.4	34.7
GDP (2015$m)	4.6	6.3	2.8	13.7
Employment (FTEs)	32	46	19	97

Table 40 Wellington

	Direct	Indirect	Induced	Total
Output (2015$m)	19.7	22.5	7.8	50.1
GDP (2015$m)	6.7	9.0	4.1	19.8
Employment (FTEs)	46	67	28	140

Table 41 Nelson – Tasman - Marlborough

	Direct	Indirect	Induced	Total
Output (2015$m)	366.7	418.3	144.8	929.8
GDP (2015$m)	124.4	167.6	75.6	367.6
Employment (FTEs)	849	1,242	512	2,602

Table 42 West Coast

	Direct	Indirect	Induced	Total
Output (2015$m)	34.2	39.0	13.5	86.7
GDP (2015$m)	11.6	15.6	7.0	34.3
Employment (FTEs)	79	116	48	243

Table 43 Canterbury

	Direct	Indirect	Induced	Total
Output (2015$m)	393.0	448.3	155.2	996.4
GDP (2015$m)	133.3	179.6	81.0	393.9
Employment (FTEs)	909	1,331	548	2,789

Table 44 Otago

	Direct	Indirect	Induced	Total
Output (2015$m)	27.1	30.9	10.7	68.7
GDP (2015$m)	9.2	12.4	5.6	27.1
Employment (FTEs)	63	92	38	192

Table 45 Southland

	Direct	Indirect	Induced	Total
Output (2015$m)	23.7	27.0	9.4	60.1
GDP (2015$m)	8.0	10.8	4.9	23.8
Employment (FTEs)	55	80	33	168

Appendix E References

GSGislason (2007). “A marine sector national report card for Canada, methodology report”, prepared for: Canada Fisheries & Oceans Ottawa, Ontario by GSGislason & Associates Ltd. Vancouver, BC, February 2007.

NZIER (2016). “Economic impact of the seafood sector, an input-output and CG assessment”, NZIER final report to Ministry for Primary Industries, Wellington, 29 February 2016.

SACES (1999). Value of New Zealand recreational fishing, Project: REC9801, undertaken for New Zealand Ministry of Fisheries by the South Australian Centre for Economic Studies, November 1999.