Business and Economic Research Limited

Report to:

Venture Taranaki

ECONOMIC IMPACT OF THE COMMERCIAL FISHING INDUSTRY IN THE TARANAKI REGION

Final Report

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Economic Impact of the Commercial Fishing and Seafood Processing Industries on the Taranaki Economy

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1 Summary

This report has been prepared for Venture Taranaki to provide an independent economic impact assessment of the commercial fishing and seafood processing sector on the Taranaki region.

If the option chosen in the Draft Threat Management Plan were to result in the commercial fishing and seafood processing industries having to close, the Taranaki economy would lose between $4.7 million and $7.6 million in gross domestic product (GDP) and 79 full-time equivalents (FTEs).

The commercial fishing and seafood processing sector in the Taranaki region consists of:

- two processing companies employing 19 Full Time Equivalents with sales expected to be around $6.6 million annually;
- ten commercial fishing vessels employing 32 Full Time Equivalents with sales of close to $3.4 million annually.

The direct economic impact of the sector on the Taranaki region annually is:

- output: $10.0 million
- GDP: up to $4.5 million
- employment: 45 Full Time Equivalents.

Direct economic impacts exclude the two crayfish operations, but include processing of albacore from transient tuna vessels.

Adding the indirect and induced effects to the direct activity generated, the total impact of the sector on the Taranaki region annually is:

- output: $14.7 million
- GDP: up to $7.6 million
- employment: 79 Full Time Equivalents.

There is potential for the industry to contribute at least a further $500,000 to GDP, which would employ a further five people in the region.

The loss of the seafood sector will result in ongoing structural impacts. These include:

- difficulties in those in the industry changing occupations resulting in long term unemployment
- lost export revenue to the region
- lost capital and fishing quota.
- retailers that rely on the availability of fresh seafood from the processors.

2 Introduction

This report provides an economic impact analysis of the commercial fishing and seafood processing sector on the Taranaki economy. This analysis will contribute to a submission on the Draft Dolphin Threat Management Plan, focussing on the economic impact on the region if the Plan results in closure of the commercial fishing and seafood processing sectors.

In this analysis, the approach is based upon discussions with the industry to determine output and employment, tempered by existing data from the Statistics New Zealand Business Frame data. From output and employment we can calculate GDP contribution.

This approach will ensure that the data are as up to date and as accurate as possible, particularly as the Business Frame data is as at March 2006. For example, we are aware that a new seafood processor has recently set up in the region suggesting two seafood processors where the Business Frame only lists one.

This analysis does not attempt to determine whether the industry would close, or the proportion of activity that would be lost, if a particular option in the Draft Dolphin Threat Management Plan were selected. It simply provides the total effect of the commercial fishing and seafood processing sector on the Taranaki region. We have excluded crayfish operations from the analysis as we consider that this industry should not be significantly affected by the Plan.[1]

The technique of multiplier analysis is discussed in the appendix. This discussion identifies the methodology behind multiplier analysis, how the analysis should be interpreted, and potential issues when using multiplier analysis at a regional level. We also discuss earlier reports where we have looked at the fishing industry and discuss their relevance to identifying the economic impact of the commercial fishing and seafood sector.

[1] Although we do note that some of their services (such as crayfish bait and ice) would diminish if other fishers and processors were to close. However, the level of effect this would have on the viability of the crayfish industry is unknown.

3 Economic Impact of Commercial Fishing and Seafood Processing on Taranaki

This section outlines the economic impacts of commercial fishing and seafood processing on the Taranaki region economy.

If the option chosen in the Draft Threat Management Plan were to result in the commercial fishing and seafood processing industries having to close, the Taranaki economy would lose between $4.7 million and $7.6 million in gross domestic product (GDP) and 79 full-time equivalents (FTEs).

We argue that employees in the fishing industry would find it difficult to find work in other sectors of the economy and are likely leave the region to continue in their industry. The seafood processing sector has a relatively high export component, which would be lost to the region. Finally, a significant proportion of the capital assets (including quota) are unique to the industry and would likely be mothballed rather than sold, resulting in capital losses to the individuals and to the region.

3.1 Fishing sector in Taranaki

The size of the sector in the region in terms of FTE and business units is officially identified in the Statistics New Zealand Business Frame[2]. From Table 3.1 we can see the breakdown of the sector into its component industries.

Table 3.1. Taranaki commercial fishing and seafood processing industry

Taranaki (March 2006)	**FTEs**	**business units**
Commercial Fishing		
Rock Lobster Fishing	*5*	*2*
Finfish Trawling	*10*	*8*
Line Fishing	*17*	*5*
Marine Fishing nec	*1*	*1*
Aquaculture	*2*	*3*
Total Commercial Fishing	34	19
Seafood Processing	9	1
total Commercial Fishing and Seafood Processing	**43**	**20**
Total All Industries	45,221	12,793

source: SNZ Business Frame

[2] The Business Frame is as at March 2006. The next round of data for March 2007 will not be available until late February 2008.

According to the New Zealand Business Frame, in March 2006 the commercial fishing industry in the Taranaki region consisted of 19 businesses employing 34 FTE people. In terms of total employment and businesses in the Taranaki region, the commercial fishing and seafood processing industries make up only a very small component. However, it is still a very real industry, made up of a number of small businesses and accounting for a number of families' livelihoods.

Based on discussions with fishing industry representatives in the Taranaki region, a slightly different picture emerges as to the make-up of the industry. As such we are disinclined to use the above numbers to carry out the economic impact analysis. We can, however, use them to provide a level of comfort around the accuracy of our estimations.

As the industry doesn't have too many participants, BERL has been able to determine relatively precise numbers for employment, business units and sales (output) in both the commercial fishing and seafood processing industries in the Taranaki region. These are presented in Table 3.2.

Table 3.2. Commercial fishing and seafood processing demographics

Taranaki fishing industry (October 2007)	FTEs	business units	output
commercial fishing			
trawlers/set net	*6*	*2*	
set net only	*11*	*3*	
longline/set net	*6*	*2*	
longline only	*3*	*1*	
crayfish	*5*	*2*	
tuna vessels transient	*na*	*na*	
commercial fishing	31	10	$3,378,835
seafood processing	19	2	$6,571,469
total commercial fishing and seafood processing	**50**	**12**	**$9,950,304**

Source: BERL

The sector (excluding crayfish operations) is expected to employ 45 FTEs across ten businesses and generate annual sales of close to $9.6 million.

There are ten commercial fishing operations in the Taranaki region. Seven of these operations use set nets. Of these, three set net fish only; two also trawl; and two also use long lines. Another operation only uses long lines and two are crayfish operations[3]. Each of these operations will be affected if options identified in the Draft Threat Management Plan are adopted.

[3] Note that we have excluded the crayfish operations from the calculations. However, if other businesses close, such as the processing businesses, these crayfish operations will find it more difficult to access necessary services such as ice, netting etc.

There are two seafood processing plants in the region. Together they employ 19 FTEs and will generate close to $6.6 million[4] in sales annually.

These processing plants are reliant on the commercial fishing industry for their fish and purchase most of the landed catch in the region. Even a reduced catch by the commercial fishers will have an impact on the profitability and viability of these two processors.

There is also a transient albacore tuna fleet that fishes off the Taranaki coast. One of the processors already handles some of their catch and there is potential to increase this activity once port facilities are improved.

3.2 Multiplier analysis

With an up to date and accurate measure for both direct employment and output, the only variable to estimate is GDP, or value added. To estimate GDP we can use the multipliers derived from the regional input-output tables.

For the indirect and induced effects we have started from the known direct output and employment numbers. We have calculated value added (GDP) from both the employment number and the output value, which provides a range that GDP is most likely to fall between.[5]

The multipliers are derived from the input-output tables generated by Butcher and Associates and are shown in Table 3.3.

[4] Ocean Pearl has only been in operation 10 months and so is building up its capability and capacity. It has budgeted sales in the next financial year of close to double what it has sold since its inception. Our analysis uses the budgeted sales for the next financial year.

[5] The difference between the GDP calculated by the output and employment methods are likely due either to changes in industry structure and regional inputs and outputs since the tables were finalized; or inaccurate measurement of either direct employment or direct output. Without knowing the exact reason we consider that including both values as a range is the most sensible approach.

Table 3.3. Commercial fishing and seafood processing multipliers for the Taranaki region

Taranaki region multipliers	direct	Type I + indirect	Type II + indirect + induced
output			
commercial fishing	1	1.37	1.52
seafood processing	1	1.35	1.45
GDP	*GDP per $m of output*		
commercial fishing	0.33	1.5	1.76
seafood processing	0.31	1.46	1.64
employment	*FTEs per $m of output*		
commercial fishing	4.25	1.45	1.67
seafood processing	2.68	1.68	1.89

source: Butcher and Associates

These multipliers are applied to the direct output and employment values identified earlier in this report are shown below in Table 3.4.

Table 3.4. Commercial fishing and seafood processing multiplier analysis

Multiplier Effects	**direct**		**direct + indirect**		**direct + indirect + induced**	
	actual output	*actual employ.*	*output approach*	*employ. approach*	*output approach*	*employ. approach*
commercial fishing						
output ($m)	**3.379**		4.629		5.136	
GDP ($m)	1.115	2.149	1.673	3.223	1.962	3.781
employment (FTEs)		**26**		38		43
seafood processing						
output ($m)	**6.571**		8.871		9.529	
GDP ($m)	2.037	2.339	2.974	3.415	3.341	3.836
employment (FTEs)		**19**		32		36
total fishing and processing						
output ($m)	**9.950**		13.500		14.664	
GDP ($m)	3.152	4.488	4.647	6.638	5.303	7.617
employment (FTEs)		**45**		70		79

Source: BERL

Bolded numbers in the table are the actual numbers determined through discussions with the sector. GDP has been estimated based on output and employment.

The sector accounts for around $10.0 million of direct regional output, and contributed between $3.2 million and $4.5 million to regional GDP and employed 45 FTEs.

Adding indirect and induced impacts increases regional output to $14.7 million, regional GDP to between $5.3 million and $7.6 million and employment to 79 FTEs.

The greater proportion of direct output and GDP comes from the seafood processing industry whereas the commercial fishing industry makes a larger contribution to direct employment. This continues through to the indirect and induced effects, with the higher multipliers in the seafood processing industry resulting in even greater relative impacts.

Potential increases in contribution

An earlier BERL report (2006) on the EIA of a proposed marina in the region suggested that the industry had the potential to increase its activity through an additional fulltime vessel and servicing the transient tuna fleets that fish off the coast of Taranaki. The report identified a potential increase of $540,000 to regional GDP and a further five FTEs.

3.3 Other issues

Additionality

An argument against multiplier analysis, particularly in times of low unemployment, is that jobs lost in the industry will be quickly picked up in other sectors of the regional economy. In the case of the commercial fishing sector in particular, this is unlikely. The ability for displaced fishermen to work in other sectors is likely to be low and will require significant skills training. A more likely outcome would be that these displaced people would be unemployed.

Export focus

A large proportion of the production from the fishing and seafood processing sector is exported outside the region.[6] If the industry were to close then exports out of the region would fall, regardless of whether the resources were reallocated.

Capital losses

The majority of capital assets are unique to the fishing industry – boats/nets. These cannot easily be deployed or transferred to other industries suggesting a loss of capital to the region.

Quota losses

If commercial fishing is not profitable then it is likely that the existing quota allocations will go unused.

Reduced efficiency

Others in the industry, such as the lobster operations, rely on the processors for bait and ice. Their operations would be adversely affected if the processors could no longer supply those factors of production.

Other local retailers who purchase off the processors would also be adversely affected. In particular the fish supply on the Marina, which is inextricably linked with Ocean Pearl fisheries.

[6] For Egmont Seafoods Limited, approximately 45 percent of sales are outside the Taranaki region.

Appendix A: Multiplier analysis

The current economic impact of the commercial fishing and seafood processing sector in the Taranaki region was determined by applying multiplier analysis to 2006 industry employment figures released in the 2006 Business Frame. These figures were tested and revised in discussion with the seafood processing and commercial fishing sector in Taranaki.

Employment, GDP and output multipliers were applied for each of the constituent industries, and then their total impacts added.

This multiplier analysis uses multipliers derived from inter-industry input-output tables for the Taranaki region. The Taranaki region input-output tables have been derived from the national input-output tables and other data by Butcher Partners, Canterbury - a recognised source for regional input-output tables and multipliers.[7]

Multipliers allowed us to identify the direct, indirect and induced effects in terms of output (GDP) and Full Time Equivalent (FTE) employment.

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 $ thousand at constant prices. Gross output is made up of the sum of:

- compensation of employees (i.e. salaries and wages)
- income from self employment
- depreciation
- profits
- indirect taxes less subsidies
- intermediate purchases of goods (other than stock in trade)
- intermediate purchases of services.

[7] For a discussion on regional input output tables and the validity and reliability of the Butcher input output tables see *Statistics New Zealand (2003) Regional Input Output Study.*

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
- depreciation
- 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 the percentage of time an employee works represented as a decimal. A full-time position is 1.00; a part-time position is 0.50.

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 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** effect.
- Persons 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** 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 is, the higher the multiplier effects. Conversely, the more reliant an industry is on supply inputs from outside the region, 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 so forth, 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.

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 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 6 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 the New Zealand borders.

Similarly, it would also be more accurate to determine a north island/south island split. As smaller regions without obvious geographic boundaries are selected, a higher level of assumptions needs 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 B: Note on previous work

An initial study by BERL in June 2006 into the economic impact of a Marina redevelopment identified a total economic impact of the fishing and seafood processing sector as having output of $7.2 million, contributing $2.66 million to regional GDP and accounting for the employment of 27 FTEs.

There was also potential to increase output by $1 million if the region could service the transient albacore tuna fishery vessels, which fished off the Taranaki coast. Taking into account indirect and induced effects, this could add a further $1.48 million to output, $540,000 to GDP and an extra 5.1 FTEs.

This analysis was based on discussion with the seafood processing sector where it was estimated that commercial fishing produced an output of $3 million and processing had output of $1.8 million.[8]

A later study by BERL in June 2007 into the economic impact of Port Taranaki used official Statistics New Zealand numbers from the Business Frame to show that the fishing and seafood industries accounted for around 40 FTEs contributing around $3.7 million to regional GDP. This study did not undertake a multiplier analysis of these numbers.

Earlier reports

	output (000s)		GDP (000s)		employment (FTEs)	
	direct	total	direct	total	direct	total
2006 study	4,800	7,170	1,548	2,657	15	27
2007 study	na	na	3,770	na	40	na

The second study rightly suggests a significantly higher output and, therefore, economic impact of the sector on the regional economy.

Apart from the narrow focus of the first study, which did not account for the commercial fishing sector, a major difference between the two studies is that the analysis in the first report was approached from an output perspective. BERL identified the expenditure of the industry based on discussions with industry players to determine GDP and employment. The second study used official FTE numbers to determine output and GDP without assessing the actual economic impacts.

The discrepancies with the direct numbers can be attributed to a number of factors, not least the accuracy of the input-output tables that underpin the calculations. Another key factor is

[8] The $7.7 million only accounts for the processing component of the sector. The $3 million output from the commercial fishing should also be included into the output from the processing sector. This narrow focus significantly underestimates the broader impact of the sector.

the small size of the industry, which means that rounding to ensure privacy could potentially have a significant impact on the Business Frame data. Finally, inflators were not used to determine output from FTEs, which suggest that the output and GDP numbers would be underreported.

The fishing industry was not the main focus of either of the earlier reports and so it would not be appropriate to use either of the number as the economic impact of the sector on the regional economy. A better approach is to undertake a more robust analysis of the fishing industry in the region – combining methods from both earlier reports to come up with a more accurate description of the industry in the region and then applying multiplier analysis to identify the economic impacts.