



REPORT TO :
WESTERN ROCK LOBSTER COUNCIL

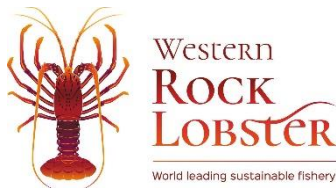
DECEMBER 2017

ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY





2017-084 WRL IPA: ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY TO WESTERN AUSTRALIA
AND AUSTRALIA IS SUPPORTED BY FUNDING FROM THE FRDC ON BEHALF OF THE AUSTRALIAN GOVERNMENT



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SUMMARY AND KEY FINDINGS

ACIL Allen Consulting (ACIL Allen) has been engaged by the Western Rock Lobster Council (WRLC) to undertake an economic contribution study of the Western Rock Lobster Industry in 2016-17. In estimating the economic value of the Western Rock Lobster Industry, ACIL Allen developed an understanding of the Industry's supply chain, which provided the framework for the assessment of the Industry's key sectors and regions of operation.

The Western Rock Lobster Industry is an intrinsic part of the economic and social fabric of many coastal communities in Western Australia. While there are eight species of rock lobster off the coast of WA, the entire commercial catch of lobsters in WA is the Western Rock Lobster. The species represents one of the biggest single species fisheries in Australia, and WA is considered a world leader in the management of the Western Rock Lobster fishery.

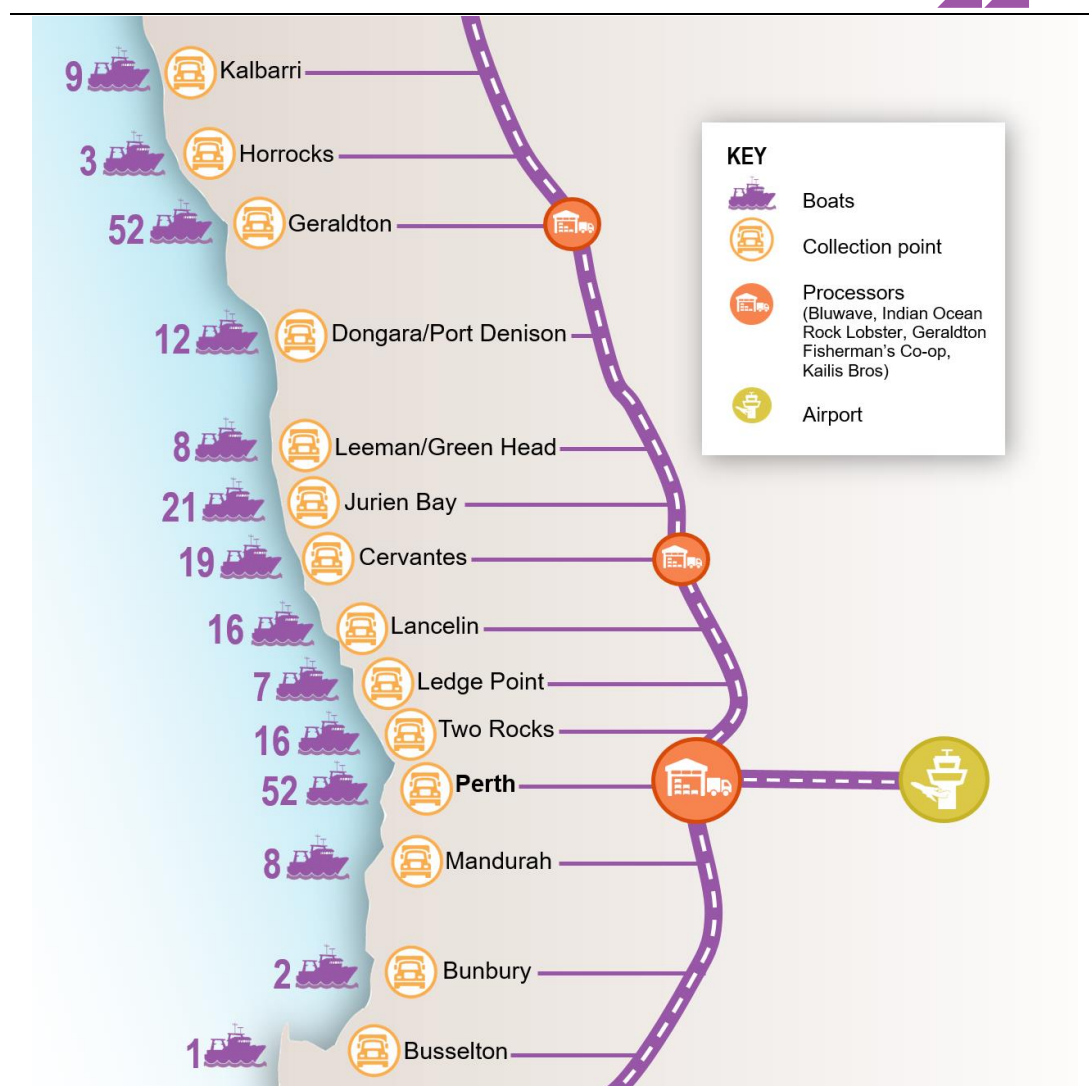
In recognition of the pursuit of sustainability for the fishery, the Western Rock Lobster fishery was the first globally to achieve Marine Stewardship Council (MSC) certification, and has successfully maintained MSC Certified status since. Independent research has found that the MSC certification generates significant value to the Industry, through its social licence to operate, research and development direction and planning, improved management practices, credibility, government confidence and environmental responsibility.

The domestic sale and export of Western Rock Lobster – whether live, cooked or frozen – allows the Industry to generate opportunities in a range of sectors of the economy, from ship and boat manufacturing; seafood processing, transport and tourism. This study provides a further contribution to the knowledge of the Western Rock Lobster Industry by calculating its economic contribution to the WA economy and its regions.

Official reports suggest that the Western Rock Lobster's economic value to the WA economy is comparable to key primary industries such as wool, meat and sheep, and milk production. And relative to other jurisdictions, the Western Rock Lobster is a market leader, accounting for almost 58 per cent of Australia's lobster exports, and more than double the exports of lobsters from New Zealand.

ACIL Allen found that the Western Rock Lobster Industry generates hundreds of millions of dollars to the WA economy and its regions each and every year. The economic contribution is reflected across the Industry supply chain, where some 226 lobster boats offload their catch to receipt points before being transferred onto trucks or directly to local processing facilities. It is at the processing facilities where the lobster catch is graded and stockpiled prior to export or on-sale to the local market. A stylised version of the supply chain is presented below.

FIGURE ES 1 WESTERN ROCK LOBSTER INDUSTRY SUPPLY CHAIN



SOURCE: ACIL ALLEN CONSULTING

In estimating the economic contribution of the Western Rock Lobster Industry, ACIL Allen has used its Input-Output models of the WA economy and its regions to produce results in terms of its contribution to economic output (Gross Value Added) and employment (FTE jobs) in the reference year of 2016-17. ACIL Allen further estimated the economic contribution of the Industry across the four sectors that make up the Industry, namely Fishery, Processed Seafood Processing, Boat Building, and Tourism.

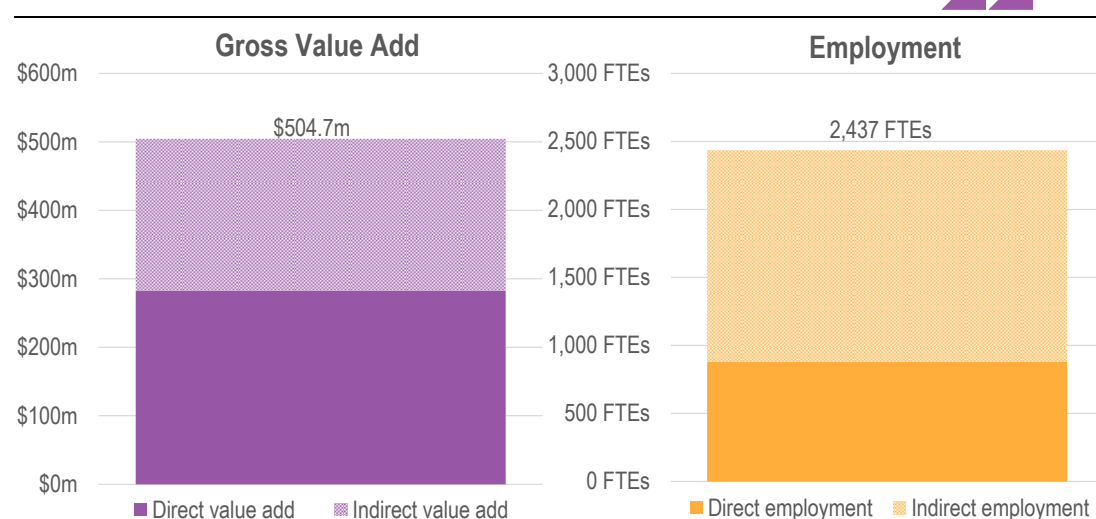
ACIL Allen estimates the Industry accounted for \$282 million of direct economic output across WA in 2016-17, which is the result of the *value added* activities generated in the Industry across the supply chain – from harvesting through to export to market. This level of activity in turn generated a further \$222 million in indirect economic output across WA, primarily in the form of additional consumption spending from the wages and incomes generated by participants in the Industry.

Overall, it is estimated that the **Western Rock Lobster Industry generated \$505 million in direct and indirect economic output in the WA economy in 2016-17**. The implied Industry multiplier is 1.79, which means that for every dollar spent by the Industry in WA, additional spending of \$0.79 is generated across the economy.

In terms of employment, the Industry directly accounted for 878 FTE jobs in 2016-17. A further 1,558 indirect FTE jobs were generated throughout the economy as a result of the activities across the Industry value chain.

Overall, the **Industry accounted for 2,437 direct and indirect FTE jobs in 2016-17**. The implied Industry employment multiplier is 2.77, meaning that for every direct FTE job generated by the Industry in WA, a further 1.77 FTE jobs are generated throughout the economy.

FIGURE ES 2 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, 2016-17



SOURCE: ACIL ALLEN CONSULTING

The largest sector that makes up the Industry in Gross Value Added terms is the Fishery sector, accounting for 85 per cent (or \$241 million) of the total direct economic output generated in the Industry. The Processed Seafood Manufacturing sector accounted for the majority of the remaining direct output generated by the Industry (15 per cent or \$41.2 million).

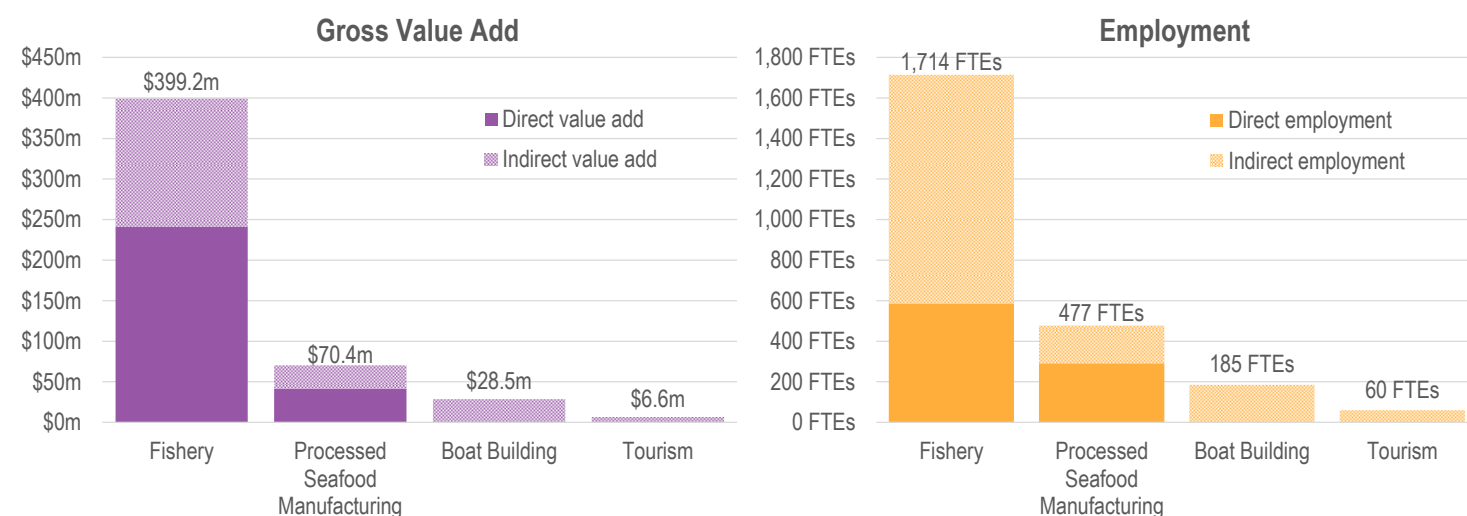
To generate this level of economic output, these sectors in turn require inputs from other sectors that are part of the Industry's overall supply chain, generating indirect value added activity in the WA economy. An additional \$158 million in indirect economic impact was generated in the Fishery sector, \$29.2 million in Processed Seafood Manufacturing, \$28.5 million in Boat Building, and \$6.6 million in Tourism activities.

Across the Industry supply chain, the **Fishery sector generated the largest direct and indirect economic impact (\$399 million), with significant contributions in Processed Seafood Manufacturing (\$70.4 million), Boat Building (\$28.5 million) and Tourism (\$6.6 million) in 2016-17.**

In terms of employment, the Fishery sector was the largest employing sector in the Industry, with 587 FTE jobs directly employed in the sector, and a further 1,127 FTE jobs indirectly employed in the Fishery sector. In total, there were 1,714 direct and indirect FTE jobs created in the Fishery sector in 2016-17.

The Processed Seafood Manufacturing sector is the second largest employer across the Industry supply chain, directly employing 291 FTE jobs, with a further 186 FTE jobs indirectly created as a result of the activities generated in the Industry. In total, there were 477 FTE jobs created in the Processed Seafood Manufacturing sector as a result of the Western Rock Lobster Industry.

The Industry also generated scores of jobs in Boat Building (185 FTE jobs) and Tourism (60 FTE jobs) sectors in 2016-17.

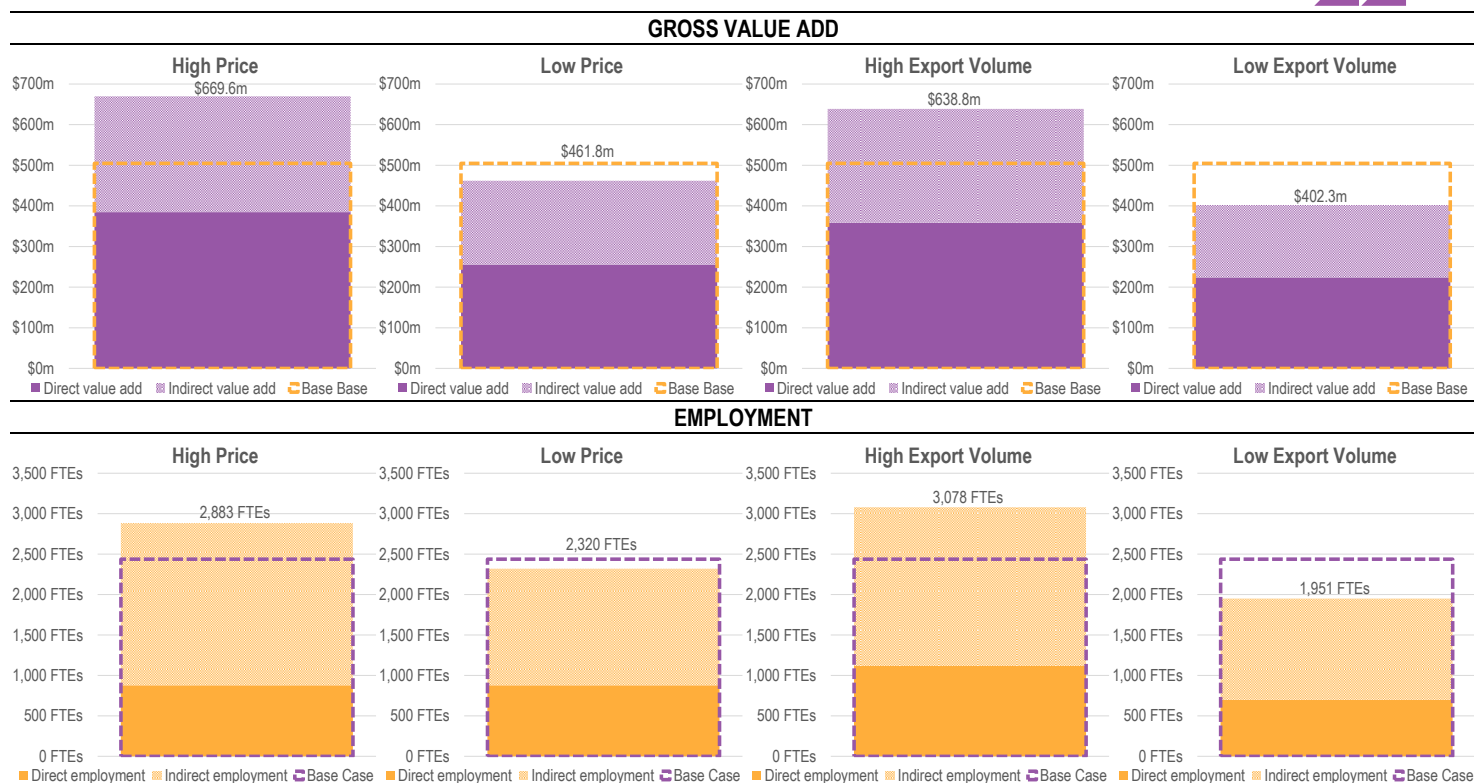
FIGURE ES 3 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY SECTOR, 2016-17

SOURCE: ACIL ALLEN CONSULTING

In order to assess the degree to which the Industry changes depending on the export price or the quantity exported, ACIL Allen also undertook sensitivity analysis modelling the most recent low and high export prices achieved by the Industry, and a low and high export volume scenarios as realistic bounds for the contraction or growth of the total catch in the Industry in a given year. Relative to the base case results:

- under the **low price** scenario it is estimated the Industry's total output will fall by eight per cent to \$462 million, and employment will fall by five per cent to 2,320 FTE jobs;
- under a **high price** scenario it is estimated the Industry's total output will increase by 33 per cent to \$670 million, and employment will rise by 18 per cent to 2,883 FTE jobs;
- under a **low export volume** scenario it is estimated the Industry's total output will fall by 20 per cent to \$402 million, and employment will fall by 20 per cent to 1,951 FTE jobs; and
- under a **high export volume** scenario it is estimated the Industry's total output will increase by 27 per cent to \$639 million, and employment will rise by 26 per cent to 3,078 FTE jobs.

FIGURE ES 4 SENSITIVITY ANALYSIS – LOW AND HIGH PRICES; LOW AND HIGH EXPORT VOLUMES

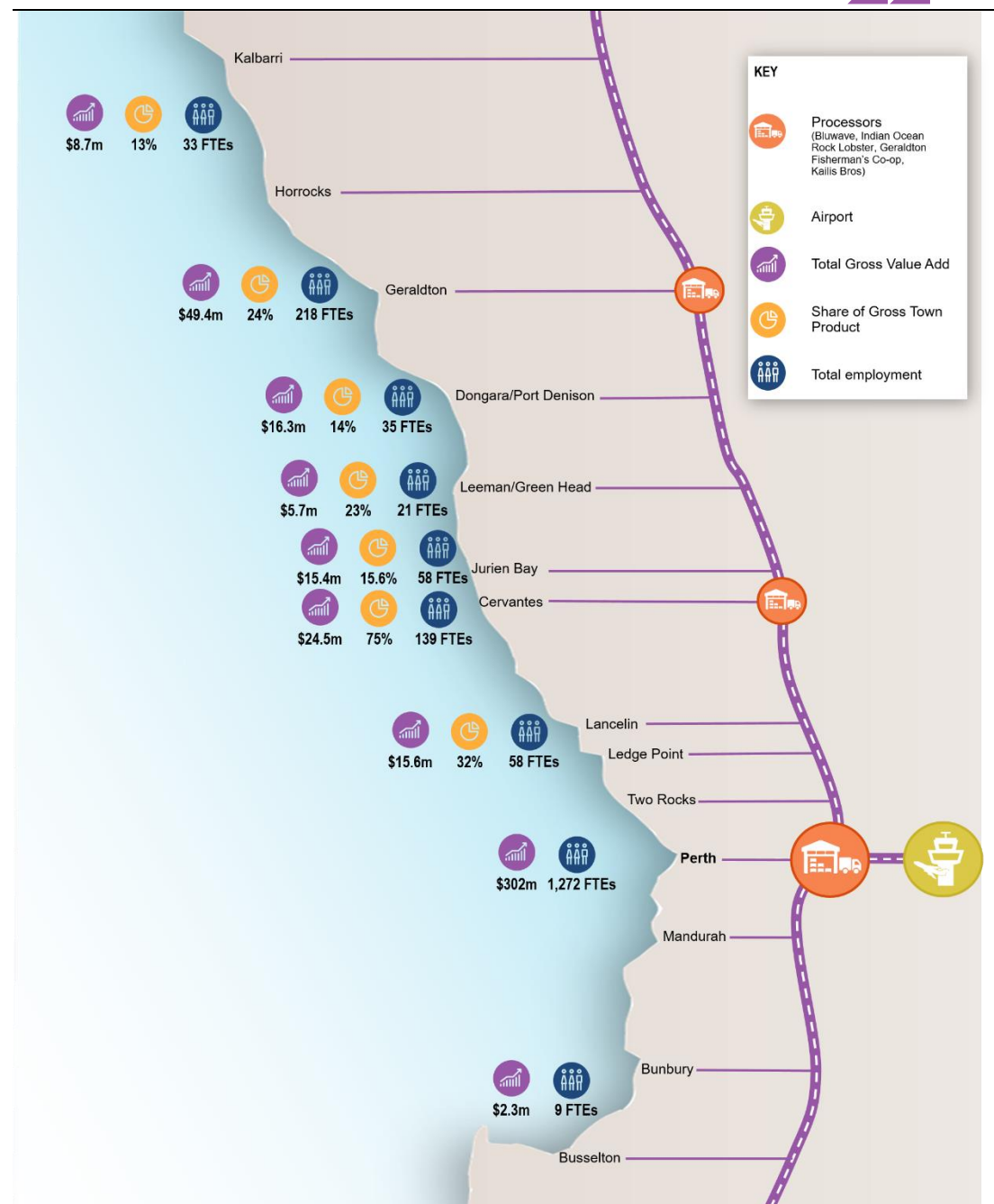


For the purposes of this study, ACIL Allen also estimated the community and economic benefits arising from the Western Rock Lobster Industry at a regional and town level. In calculating these benefits, ACIL Allen estimated the Gross Town Product the relevant towns using ACIL Allen's modelling framework.

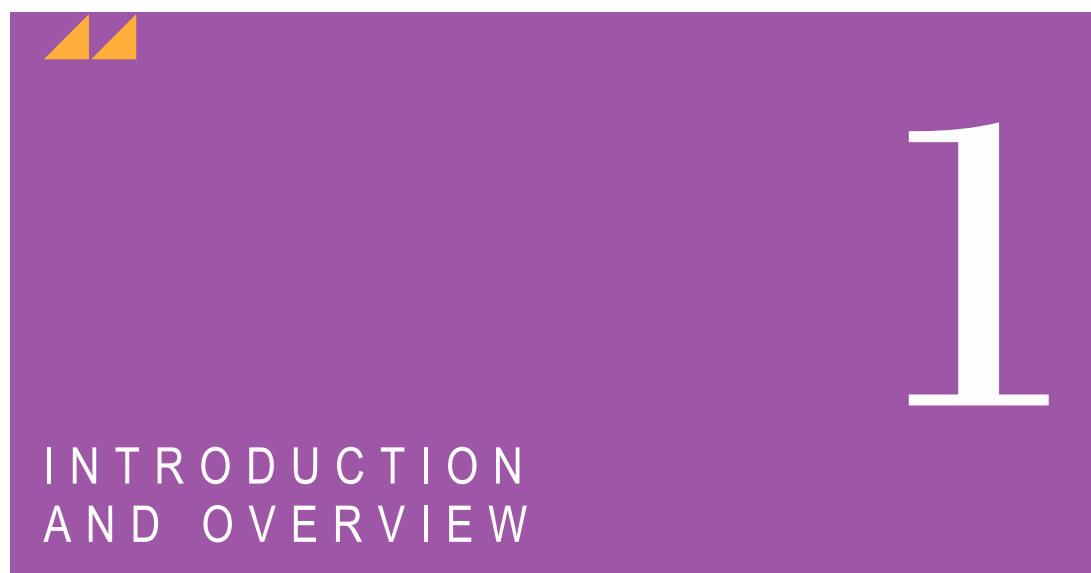
The **Northern Zone** was defined to include Kalbarri, Geraldton, Dongara/Port Denison, Leeman, Jurien Bay, Cervantes, and Lancelin. ACIL Allen estimated that the Western Rock Lobster Industry generated **\$122 million in economic output and 581 FTE jobs in the Northern Zone in 2016-17**. The largest share of this output was concentrated in Geraldton (\$49.4 million), followed by Cervantes (\$24.5 million), Dongara/Port Dennison (\$16.3 million), Lancelin (\$15.6 million), Jurien Bay (\$15.4 million), Kalbarri (\$8.7 million) and Leeman (\$5.7 million).

The **Southern Zone** was defined to include Metropolitan Perth, Bunbury and Busselton. ACIL Allen estimated that the Western Rock Lobster Industry generated **\$308 million in economic output and 1,324 FTE jobs in the Southern Zone in 2016-17**, the majority of which was generated in Perth.

FIGURE ES 5 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY LOCATION



SOURCE: ACIL ALLEN CONSULTING



1.1 Our Task

ACIL Allen Consulting (ACIL Allen) has been engaged by the Western Rock Lobster Council (WRLC) to undertake an economic contribution study of the Western Rock Lobster industry (the Industry).

The WRLC is the peak industry body representing the interests of the Industry. Its mission is that the Western Rock Lobster fishery is an iconic leader in sustainable fisheries management. The WRLC is delivering on its mission through its strategic plan, which has as one of its priorities *to demonstrate the WRL fishery's value to the economy and regional communities*.

This economic contribution study will provide the WRLC with evidence based information to effectively promote the industry's value to our stakeholders, government and the broader community.

In undertaking this study, ACIL Allen has developed a framework that will allow for the economic contribution of the Western Rock Lobster Industry to be measured on an annual basis. The data provided by stakeholders in this study has been de-identified and aggregated to an industry level in order to protect the confidential nature of the data supplied. Future updates of the economic contribution of the Western Rock Lobster Industry will be based on the methodology used in this study, to ensure the comparability of the data sources over time.

1.2 A Brief Introduction to the Western Rock Lobster Industry

The Western Rock Lobster Industry is an intrinsic part of the economic and social fabric of many coastal communities in Western Australia.

The Western Rock Lobster Industry is an intrinsic part of the economic and social fabric of many coastal communities in Western Australia. While there are eight species of rock lobster off the coast of WA, the entire commercial catch of lobsters in WA is the Western Rock Lobster. The species represents one of the biggest single species fisheries in Australia, and WA is considered a world leader in the management of the Western Rock Lobster fishery.

The Industry has been recognised for its potential as fishery since the early days of settlement within WA², however commercial fishing commenced only in the mid 1950s from its traditional roots in Geraldton, Lancelin Island and Fremantle. The Western Rock Lobster is now considered a premium product internationally, and is consistently valued higher per kilogram than majority of other species on the market.

The growth of the Industry during the 1950s pushed fishers to increasingly remote waters, and as a consequence settlements adjacent to ideal anchorage points were developed in order to service vessels. Towns such as Cervantes, Leeman, Jurien Bay and Kalbarri were established during this time, as fishers sought a more settled lifestyle with a place for family life and education opportunities¹.

In 1961 the Western Fisheries Research Committee (the Committee) was established, with the intent of orienting the Industry toward optimising the catch and promoting a sustainable yield¹. The

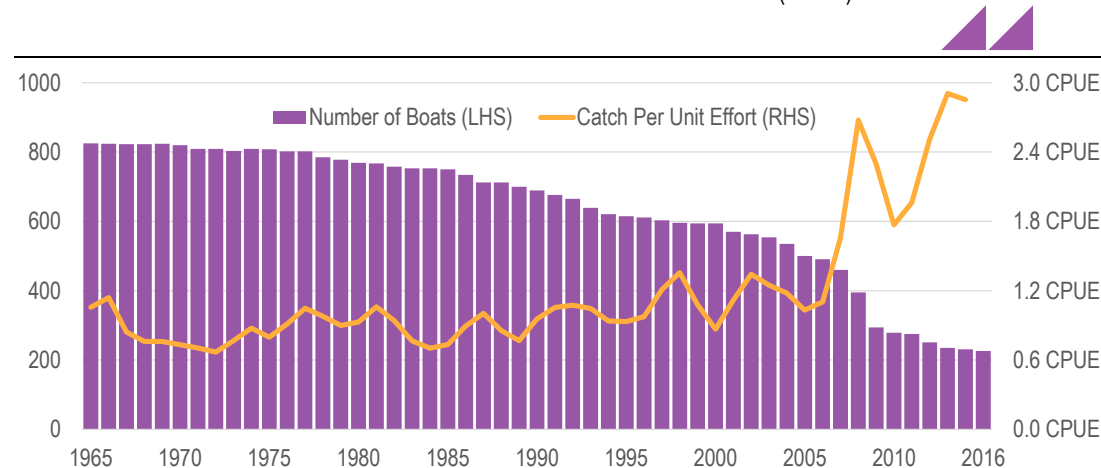
Committee and its scientific management implemented the puerulus count, which underpinned the industry and contributed to its world class reputation. The number of puerulus recorded each year shows a strong correlation with the availability of Western Rock Lobster in the subsequent three to four years⁵.

Between 1963 and 2008, the commercial harvest averaged around 11,000 tonnes per annum, ranging between 8,000 and 14,500 tonnes¹³. In 1963, a sustainable yield for the fishery was pursued, by freezing pot and licence numbers which limited entry to the fishery. As part of the management of the fishery, boat numbers were also restricted to 836 boats in 1963, and since then they have steadily continued to consolidate (refer to Figure 1.1)¹.

In 2008, the puerulus count was at a forty year low, sparking concern within the Industry. In response, an annual commercial catch quota system was introduced, with the intent of restricting the mass of lobster available to harvest annually. Today, the total annual commercial catch is capped at 6,300 tonnes.

The Industry has continued to evolve from a fishery traditionally centred on large boats and harvests, to one that seeks to maximise effectiveness through minimising costs and managing beach prices. This can be seen by the gradual decline in boat numbers, and increase in catch per pot lift per annum in Figure 1.1. In 2016, it was estimated that some 226 boats harvested Western Rock Lobsters, as a result of the post 2011 consolidation attributed to the quota system.

FIGURE 1.1 NUMBER OF BOATS AND CATCH PER UNIT OF EFFORT (CPUE)



Note: Catch per unit of effort (CPUE) is measured by the kg of caught lobster per pot pull.

SOURCE: ACIL ALLEN CONSULTING, DEPARTMENT OF PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT

Prior to the implementation of the total annual commercial catch system, the social impacts of changes to the Industry's management on fleet hosting communities was researched by the Institute for Regional Development, in conjunction with the Fisheries Research and Development Commission. The report, published in 2007, concluded that the changes experienced by the Industry has influenced the economic foundations of coastal towns and had a role in shifting social structures in such communities¹.

KAL Analysis was commissioned by the Western Australian Fishing Industry Council in 2011 to assess the impact of the introduction of the quota system following concerns regarding the effect the new system had on coastal communities and their ability to thrive. While it was found that the quota system had had an effect on local communities, this needed to be considered in the broader context of other challenges for the localities, such as severe drought, a decline in international tourism, high fuel costs and a reduction in recreational fishing¹⁴.

In recognition of the pursuit of sustainability for the fishery, the Marine Stewardship Council (MSC) certification was pursued and achieved in 2000. The Marine Stewardship Council is an organization established to improve management systems of fisheries worldwide, and a significantly influential body in this regard³. MSC certified fisheries undergo continual monitoring, and annual audits in addition to reassessment every five years. The Western Rock Lobster fishery was the first globally to

The Western Rock Lobster Industry was the first fishery globally to achieve achieved Marine Stewardship Council certification in 2000, a status that it has maintained ever since.

achieve such certification, and has successfully maintained MSC Certified status since. The Western Rock Lobster Industry was certified for the fourth time in 2017⁴, at the estimated cost of less than \$0.01 per kilogram per year of product.

In 2015, Agknowledge prepared an independent cost-benefit analysis of the MSC certification on the Industry. The key benefits of the certification were attributed to increased social licence to operate, research and development direction and planning, improved management practices, credibility, government confidence and environmental responsibility¹⁸.

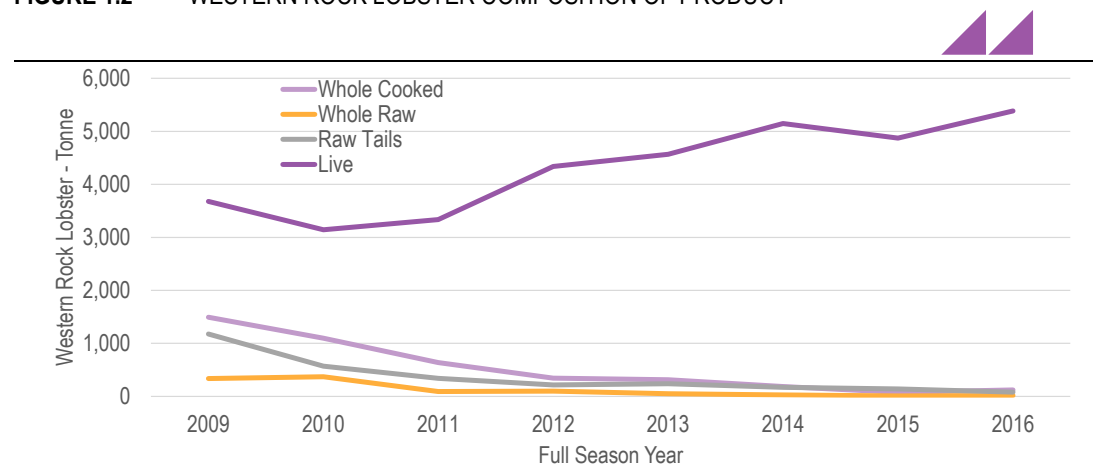
The development and sustainability of the Industry can also be seen through the value of Farm Management Deposits (FMD's) held by the Industry. The FMD scheme is a risk management strategy supported by the Commonwealth Government to assist primary producers manage uneven cash flows²². FMD's allow producers to contribute part of their income pre-tax to an account, which can be drawn upon in tougher financial years²².

The Fisheries Industry, of which the Western Rock Lobster Industry is largest component, currently represents 84 per cent (approximately \$21 million) of all deposits for the Forestry and Fishing Industry in WA. Further, the Industry's contribution is greater than WA's Dairy and Livestock Industries (each holding approximately \$160,000 in the fund).

1.2.1 The Industry today

When boats land, their product is collected at a depo or via truck and then transported to processing facilities in Metropolitan Perth, Cervantes and Geraldton. Lobsters traditionally have gone to market as fresh whole, fresh tails or pre-cooked, but in recent years there has been a strong focus on live exports along a just-in-time supply chain¹⁸. The change in product form can be seen in Figure 1.2.

FIGURE 1.2 WESTERN ROCK LOBSTER COMPOSITION OF PRODUCT



SOURCE: ACIL ALLEN CONSULTING, DEPARTMENT OF FISHERIES

Western Rock Lobsters have typically been sold domestically and exported to the USA, Taiwan and Japan. They are graded into a variety of sizes, and the USA, Taiwan and Japan each have a preference of a particular size as a result of cultural characteristics.

In recent years, all three markets have fallen as a proportion of the Western Rock Lobster export, making way for strong Chinese demand. Chinese consumers regard live lobster as a luxury status symbol, and Australia's geographical proximity to China, as well as reputation for producing a prime product has met this market opportunity. Strong demand for live exported Western Rock Lobster from China has seen the price rise steadily, taking market share away from traditional markets of Japan, Taiwan and the USA. Today it is estimated that China is the destination for more than 90 per cent of the live export market⁷.

The domestic sale and export of Western Rock Lobster – whether live, cooked or frozen – allows the Industry to generate opportunities in a range of sectors of the economy, from ship and boat manufacturing; seafood manufacturing; transport and tourism.

The domestic sale and export of Western Rock Lobster – whether live, cooked or frozen – allows the Industry to generate opportunities in a range of sectors of the economy, from ship and boat manufacturing; seafood manufacturing; transport and tourism. These opportunities, and the Industry more broadly, have been the subject of research that has focused on the Industry's target market opportunities and economic indicators.

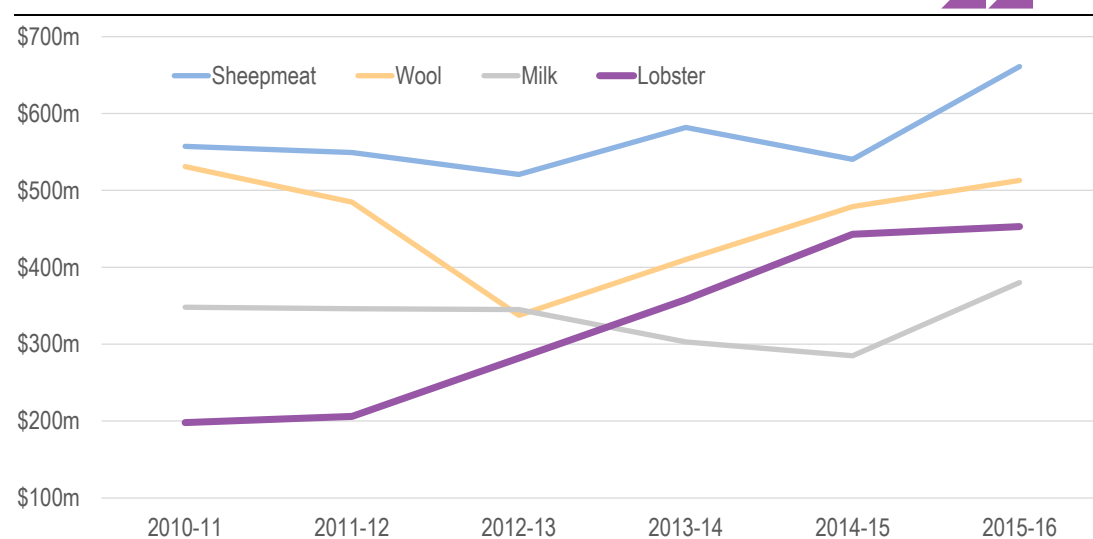
Recent reports specific to the Western Rock Lobster include the Department of Agriculture and Food commissioned report "Target market Opportunities in Asia for Rock Lobster", which details the global situation for all species of lobster and potential opportunities for Western Australia¹².

Other reports more broadly referring to the Industry, and echoing the Asia-centric sentiment currently experienced, include ANZ's report Greener Pastures in 2012 that discusses the opportunities for Australia and New Zealand in the global soft commodity market. The report details the opportunities and challenges in pursuing Asian markets, ultimately concluding that they are significant to Australian and New Zealand agriculture as a whole¹⁹.

The Department of Primary Industries and Regional Development estimated the gross value of production^a of the Western Rock Lobster in WA at \$453 million in 2015-16 (see Figure 1.3), which is comparable to Western Australian wool (\$513 million), meat from sheep (\$661 million) and milk (\$380 million) in the same year. The Industry is set apart by its rapid growth in gross value in the years between 2010-15 of 125 per cent, which is growth surpassed only by the Canola industry (299 per cent)¹².

It is estimated the gross value of production of the Western Rock Lobster in WA at \$453 million in 2015-16, which is comparable to Western Australian wool (\$513 million), meat from sheep (\$661 million) and milk (\$380 million) in the same year

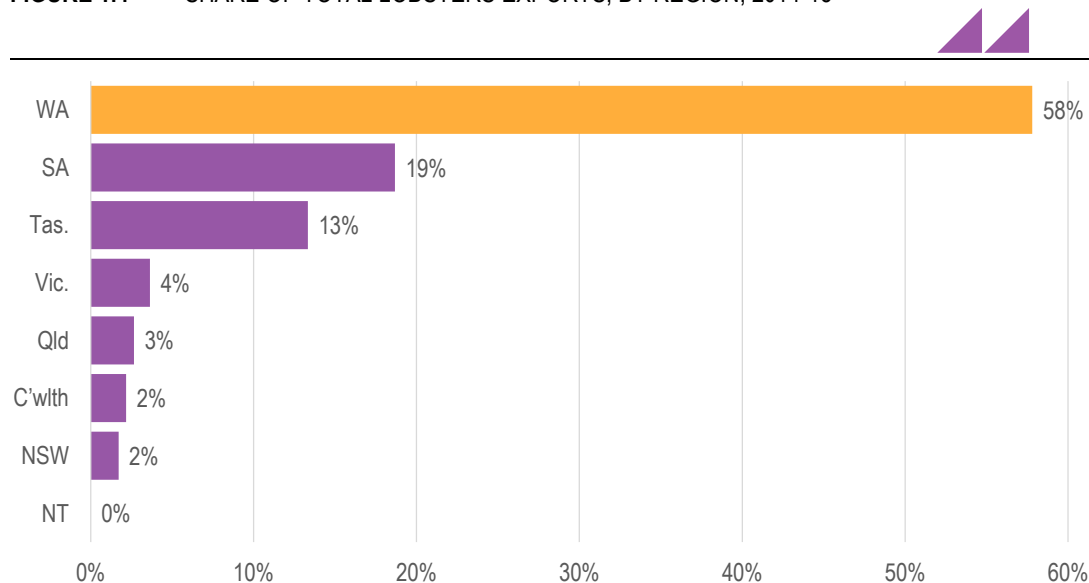
FIGURE 1.3 GROSS VALUE OF PRODUCTION, OF WESTERN AUSTRALIAN PRIMARY INDUSTRIES



SOURCE: ACIL ALLEN CONSULTING, DEPARTMENT OF PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT

Relative to other regions in Australia and New Zealand, the Western Rock Lobster Industry is a market leader, accounting for 58 per cent of the total Australian lobster exports in 2014-15²⁴, and more than double the exports of lobsters from New Zealand²⁰.

^a Gross value of production differs from Gross Value Added, which is ACIL Allen's preferred measure of the Industry's economic contribution to WA and its regional towns, as it also incorporates taxes and subsidies.

FIGURE 1.4 SHARE OF TOTAL LOBSTERS EXPORTS, BY REGION, 2014-15

SOURCE: ACIL ALLEN CONSULTING, ABARES

Relative to other regions in Australia and New Zealand, the Western Rock Lobster Industry is a market leader, accounting for 58 per cent of the total Australian lobster exports in 2014-15, and more than double the exports of lobsters from New Zealand

1.3 Estimating the Economic Contribution of the Industry

In order to estimate the economic contribution of the Industry, ACIL Allen has sourced existing Industry information and data, and supplemented this information through consultation with key representatives in the Industry. This helped ACIL Allen define the Industry's value chain, with the results of this analysis aggregated to provide a high level economic profile of industries directly linked to the Western Rock Lobster Industry.

ACIL Allen's methodology used to estimate the economic contribution of the Western Rock Lobster Industry to the WA economy is reflected in the structure of this report.

Section 2 describes the **Western Rock Lobster Industry value chain**, based on Industry research and consultation with key industry representatives. These stakeholders are listed in Appendix A, and included processors, harvesters, boat manufacturing and servicing, and finance companies. In order to protect the confidentiality of the data provided by stakeholders, all asset or location specific data in this report has been aggregated into key components of the value chain, ensuring a necessary level of detail without revealing business-specific information.

Section 3 provides a broad **profile of the key sectors that make up the Western Rock Lobster Industry**, in order to develop the financial inputs required to estimate the economic contribution of the Industry. In calculating the value of key sectors in the Industry, the starting point was the current export value of the total quota. It is assumed that processors use this amount to pay the beach price to the harvesters, cover their operational costs and generate a profit. Harvesters pay for their inputs (including labour) and retain a margin as profit/personal income.

Section 4 contains the results of the economic modelling, with the **overall economic contribution of the Western Rock Lobster Industry** calculated in Gross Value Added (GVA) terms and in relation to the contribution to employment in the WA economy. The economic contribution of the Industry is estimated by applying ACIL Allen's Input-Output table framework to the activity values of the key sectors in the Industry.

Section 5 details the results of the **sensitivity analysis**, which highlights the degree to which the Industry's economic contribution under the base case presented in the previous section increases or decreases relative to changes to the export prices received or volumes exported.

Section 6 provides a detailed profile of the **economic contribution the Industry makes to key regional towns in Western Australia**. Community benefits were estimated by allocating the state wide economic contribution to key towns and regions relevant to the Industry. This is estimated using ACIL Allen's Input-Output tables for the relevant regional economies.

1.4 Glossary of terms and abbreviations

Economic contribution	<p><i>A measure of the total economic activity in the production of new goods and services</i></p> <p>Economic contribution is a broader measure of the economy in that it includes the final value of goods and services produced (GDP/GSP/GRP), as well as the value of the intermediate consumption within the region to produce the goods and services, and imports from outside the region.</p>
Employment	<p>The number of full time equivalent job years created as a result of a project or expenditure in the economy, which includes direct and indirect (flow-on) employment.</p>
Exchange rate	<p>The exchange rate is expressed as the AUD/USD exchange rate unless otherwise stated and is denoted as \$ or A\$ throughout the document.</p>
Exports	<p>The value of goods exported and amounts receivable from non-residents for the provision of services by residents.</p>
Gross product or real economic output	<p><i>A measure of the size of an economy</i></p> <p>Gross product is a measure of the output generated by an economy over a period of time (typically a year). It represents the total dollar value of all finalised goods and services produced over a specific time period and is considered as a measure of the size of the economy. At a national level, it is referred to as Gross Domestic Product (GDP); at the state level, Gross State Product (GSP); at a regional level, Gross Regional Product (GRP); while at a town level, Gross Town Product (GTP).</p>
Gross Value Added	<p><i>A measure of the value of goods and services produced in an industry or sector of an economy.</i></p> <p>Gross Value Added (GVA) is the output of an industry or sector minus intermediate consumption. GVA therefore represents the value of all goods and services produced, minus the cost of all inputs and raw materials used to produce that good or service. Unlike Gross Product, GVA does not include the value of taxes minus subsidies.</p>
Input-Output Tables	<p>Input-Output (I-O) tables capture the direct and indirect effects of expenditure by capturing, for each industry, the industries it purchases inputs from and also the industries it sells its outputs to. For example, the I-O model for Western Australia captures purchases from and sales to industries located in Western Australia, as well as imports from outside of Western Australia.</p>
Job years	<p>Real employment is measured in job years. A job year is employment of one full time equivalent (FTE) person for one year. Alternatively it can be expressed as one 0.5 FTE person for two years.</p>

LIST OF ACRONYMS

Abbreviation	Full name
ACIL Allen	ACIL Allen Consulting
ABS	Australian Bureau of Statistics
CPI	Consumer Price Index
I-O tables	Input Output Tables
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GRP	Gross Regional Product
GSP	Gross State Product
GST	Goods and Services Tax

Abbreviation	Full name
GVA	Gross Value Added
NPV	Net Present Value
LGA	Local Government Area
UWA	University of Western Australia
WRLC	Western Rock Lobster Council
WRL	Western Rock Lobster
The Industry	The Western Rock Lobster industry



2

WESTERN ROCK LOBSTER INDUSTRY VALUE CHAIN

In order to estimate the economic value of the Western Rock Lobster Industry, ACIL Allen developed an understanding of the Industry's value chain, which was informed by consultation with key stakeholders. By developing a value chain of the Western Rock Lobster Industry, ACIL Allen is able to estimate the activities associated with the Industry, and allocate these activities to the Industry's key sectors and regions. These estimates will in turn be the key inputs required to model the economic contribution of the Western Rock Lobster Industry to WA.

For the purposes of this study, ACIL Allen has estimated the key receipt points and the estimated number of boats for key towns in the Northern Zone (defined as all towns north of Ledge Point to Kalbarri). ACIL Allen has allocated boats to major towns in the Southern Zone into two regions – Perth and the South West. Metropolitan Perth runs from Two Rocks through to Mandurah, while the South West is inclusive of Busselton and Bunbury.

Based on stakeholder feedback, the value chain can be described iteratively below.

1. **Boats** travel out and drop or tend to previously dropped pots, usually leaving port well before sunrise. The pots are left out on the ocean floor at various locations as determined by the fisherman. Once the catch has been taken on board, the pots are re-stocked with bait, and returned to the ocean floor (potentially in a different location). The catch itself is then transferred to a tank, in order to preserve the quality of the product. Sea water is pumped via an on-board series of pumps through the tanks as a part of this preservation process. Typically, pots must be attended to at a minimum of once a week.
2. Harvested product is landed at a **receipt point** where it is transferred to trucks. The trucks are equipped with spray beds, which allows for product to remain live but reduces the need for hauling significant supplies of water.
3. The harvested product is **transported by truck to a processing facility**, where it is prepared for export. A key challenge for export is the relatively short duration in which the product remains fresh. Typically, Western Rock Lobsters may remain out of the water for a maximum of 32 hours. The majority of processing and export takes place in the Perth Metropolitan area. The live product is typically packed into polystyrene cartons, with wood-shavings and additional cool packs in order to maintain its condition for export.

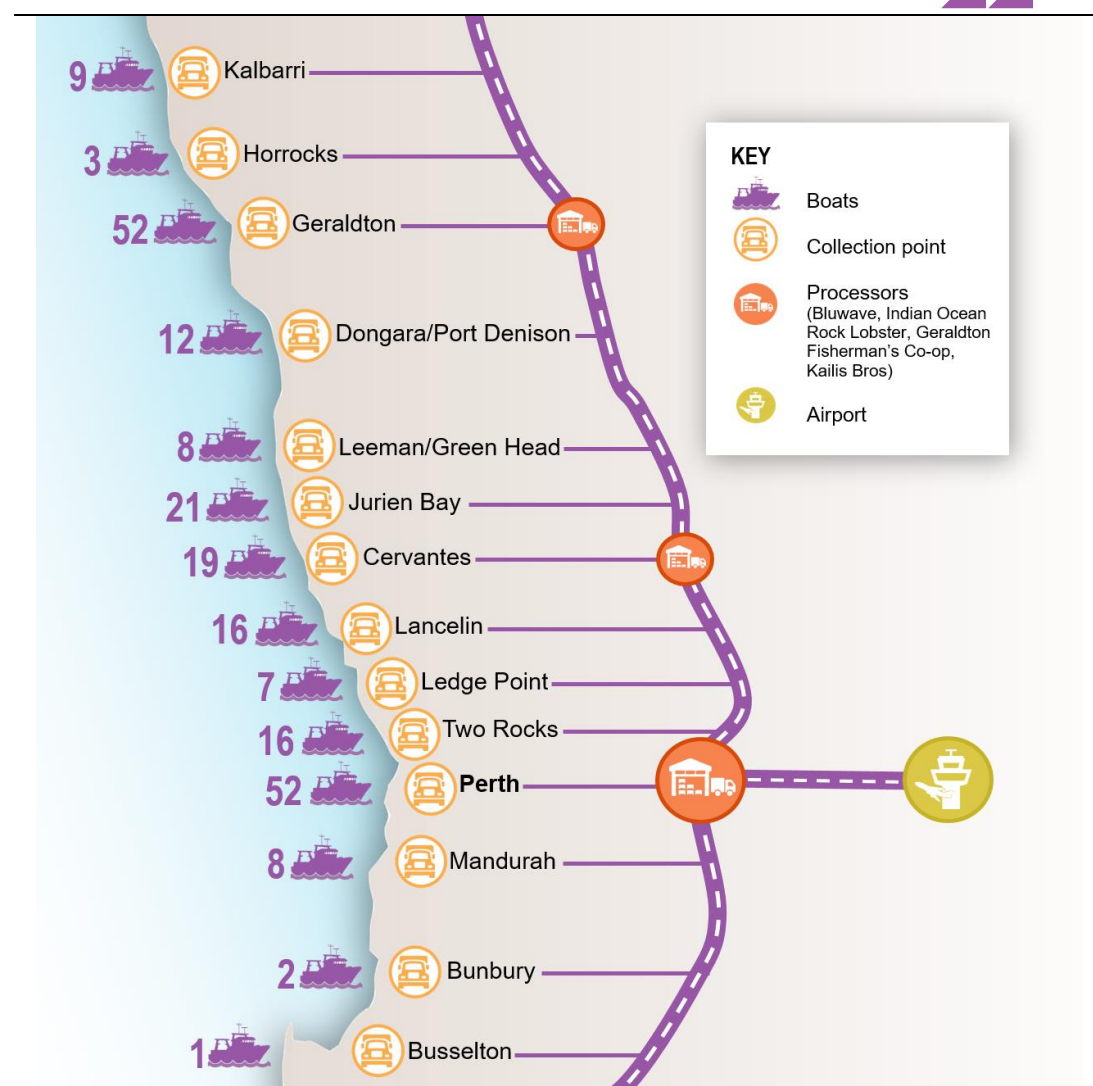
As the system is highly flexible, boats do not necessarily return to the same port/town. In order to estimate the economic activity by town, ACIL Allen allocated boats to the regions and towns based on the insights gained during stakeholder consultation, and economic data produced by the Australian Bureau of Statistics (ABS). Consultation data was referenced against ABS 2011 Census data^b which records the number of persons identifying themselves as rock lobster fishers on Census Night at a state suburb level.

^b At the time of this study, the relevant 2016 Census data was not available.

In order to protect the confidentiality of the data provided by stakeholders, all asset or location specific data in this report was aggregated into key components of the value chain, ensuring a necessary level of detail without revealing business specific information.

The Western Rock Lobster Industry value chain presented in Figure 2.1 below and described in further detail in the remainder of this section of the report.

FIGURE 2.1 THE WESTERN ROCK LOBSTER INDUSTRY SUPPLY CHAIN



SOURCE: ACIL ALLEN CONSULTING

2.1 Boats

Lobster vessels are used to collect pots and deliver product to shore. The vessels are usually designed specifically for the open water experienced by Western Rock Lobster fishermen, and engineered to withstand harsh and technically challenging conditions.

The boats used range from 52ft to 65ft, although it was noted that smaller and larger boats than this are in operation. An increasing trend in the Industry is towards larger boats (both new and second hand), reflecting a push to achieve greater efficiencies in the harvesting of Western Rock Lobsters by increasing carrying capacity.

Key inputs required for the operation of boats include lobster pots, fuel, bait, labour, fishing equipment and servicing and maintenance:

- **Pots** are constructed from jarrah, with a steel base and usually some form of anode. They cost approximately \$250 a pot, according to stakeholders consulted. Approximately 25 per cent of pots are replaced per year due to degradation over time. While pots are usually purchased from a supplier, they are often made by a fisherman's crew when not fishing, such as during periods where prices are low or weather conditions poor.
- **Fuel** consumption varies depending on where the boats fish off the coast, and the size of the boat. Harvesters typically source fuel through the processor they sell product to. This way processors can source sufficient quantity in order to negotiate lower prices with fuel suppliers.
- **Bait** consists of fish heads, typically imported from New Zealand. Common bait species include Hoki, Blue Mulloway, Tuna and Salmon.
- Irrespective of the size of the vessel, a typical **crew** consists of three members (two deckhands and a skipper). The deckhands are employees, while the skippers are typically the license and vessel owner. Many owners employ a third deckhand for contingencies. To account for this, the study assumes 2.5 deckhands per boat (full time equivalent (FTE) basis). Crew can be paid either a fixed wage or according to the boat's catch. The assumptions in the table below take this into account.
- **Equipment** requirements, other than pots, include sea water pumps, rope, winches, on-board tanks for the catch, and other consumables.
- The amount spent on **boat servicing and maintenance** appears to depend on harvester preferences and the profits made during the year. At a minimum, boats must be lifted out of the water and be de-fouled. However, more significant maintenance requirements are needed at longer time intervals, such as an engine overhaul every five to 10 years). In good years boat owners appear to conduct non-essential repairs and modifications, while in leaner years they tend to minimise spending. The figures presented in Table 2.1 are intended to represent an industry-wide annual average for a neutral year.

TABLE 2.1 LOBSTER BOAT ASSUMPTIONS

Description	Value
Annual pot cost	\$20,650
Annual fuel costs	\$74,000
Annual bait costs	\$53,200
Annual spend maintenance, per boat	\$80,000
Annual equipment costs	\$50,200
Annual wage for skipper	\$130,000
Annual income per crew member (mix of fixed wage and catch based)	\$89,055
Number of boats	226
Crew per boat	2.5 (average) (FTE)
Skippers per boat	1 (FTE)
Boats	226
Boats with employed skippers	23 (approx. 10 per cent)
Total annual boat maintenance cost	\$17,038,248
Total annual fuel cost	\$15,750,000
Total annual gear cost	\$10,710,000
Total annual wages	\$50,661,748

Note: These are all averages, derived from an accurate estimate of the state wide total

SOURCE: ACIL ALLEN CONSULTING

The lobster catch from each boat is offloaded at receival points and transferred to tanks within either processing facilities or into spray bed tanks within trucks. For the purposes of this study, and to preserve the anonymity of the contributing stakeholders, each of the 226 currently operating lobster

vessels were allocated an equal portion of the total 6,300 tonne quota. This translated to 29.5 tonnes per vessel, with this standard vessel catch used to allocate state-wide estimates to regions and towns.

Table 2.1 shows the assumptions relating to boats that will be used in the model. The assumptions are all averages, derived from estimates of the state wide totals.

2.2 Receival points

Receival points are used to transfer lobsters to trucks for transport to processing facilities. In the past, physical warehousing facilities were used. These facilities contained tanks that pumped seawater through them in order to keep the product alive. Historically, such facilities employed several operators.

The majority of the consultation participants indicated that their catch was directly received and transferred to trucks, without the added handling of an additional warehouse facility, given the trend towards just in time live export. The change in the management of the fishery has seen the pursuit of economies of scale amongst the fishers, and consolidation of the Industry to have fewer, larger fishers. As such, more catch comes in at each point in time which economically justifies a more fluid receival and transferral mechanism. On this basis, it was assumed that receival points were not considered likely to generate a significant share of the fishery industry's contribution to the economy and therefore excluded from the analysis.

2.3 Trucks

Trucks are used to collect product from collection points and carry it to processing facilities. In carrying capacity, trucks range from two dead weight tonnes to ten dead weight tonnes. Trucks are for the most part dedicated lobster trucks, which is due to the requirements of the product they transport. Trucks are fitted out with a water spray system that keeps the product alive, and maximises fuel efficiency by reducing water haulage costs.

For the purposes of this study, and to preserve the confidentiality of participating stakeholders, it was assumed that the all trucks carry the same amount of product.

A five tonne truck dedicating to transporting lobsters was determined to carry approximately 400 tonnes of product over the course of a year for which it has to travel 145,500 km. It was noted that trucks typically operate on a "milk run" – servicing majority of the towns required by each processor in a loop – in order to maximise the efficiency of the operation.

Trucks typically require one full time employee to operate at any given moment, however due to contingencies it was assumed that one and a half full time employees are required to operate per five tonne truck equivalent. Other inputs include annual servicing, major servicing at longer intervals, fuel, tyres, tanks, licencing, and water pump systems. The Transport and Infrastructure Council has modelled vehicle operating costs for 20 vehicle classes to generate total average per kilometre operating cost⁹. Applied to the average travel distance estimated above – and assuming moderately rough roads at speeds of 100km per hour – the average five tonne truck equivalent operation cost in this instance is \$91,405 per annum. The Transport and Infrastructure Council allows for this figure to be broken down into sub-components – namely fuel consumption and maintenance and repair costs – which in this instance was a 49 per cent and 51 per cent split of annual costs respectively.

Table 2.2 shows the assumptions relating to trucks that will be used within the model. The assumptions are all averages.

TABLE 2.2 TRUCK ASSUMPTIONS

Description	Value
Number of trucks	16 five tonne truck equivalents
Employees per truck	1.5 FTE
Average distance travelled annually	145,500 km
Total annual cost per truck	\$91,405
Average annual wage per driver	\$50,000
Total annual wages	\$1,181,250
Total annual cost	\$1,439,622

Note: These are all averages, derived from an accurate estimate of the state wide total
 SOURCE: ACIL ALLEN CONSULTING

2.4 Processing facilities

Processing facilities are the warehouses where lobster is held prior to export or on-sale to the local market. Processing facilities are also where product is graded into each of the separately sized products available for sale.

The facilities consist of tanks and packing facilities. In the past, when live lobster exports were not the dominant product, cooked tail, cooked whole, frozen and other lobster products were processed at these facilities. While cooking, freezing and packaging facilities are still present in some of these processing facilities, it was noted that some processors are now seeking to downsize these capabilities within their operations reflecting the changing preferences in the market.

Live lobster exports currently dominate the market. For export, product is cooled to a temperature lower than four degrees (Celsius) – which induces a hibernation like state – and packaged. Inputs to processing plants include refrigeration facilities, tanks, water pumping facilities, polystyrene boxes, cool packs, wood shavings, labour and warehousing facilities.

All four processing facilities are located in the Perth Metropolitan region. Together they are assumed to employ 291 FTE staff with the average annual pre-tax incomes specified in Table 2.3.

TABLE 2.3 PROCESSING EMPLOYMENT ASSUMPTIONS

Description	Value
Support and managements staff	58 FTE
Processing employees	233 FTE
Average wage for support and managements staff	\$50,000 p.a.
Average wage for processing employees	\$60,000 p.a.
Total wages paid	\$15,151,500

Note: These are all averages, derived from an accurate estimate of the state wide total
 SOURCE: ACIL ALLEN CONSULTING

2.5 Exports of Western Rock Lobsters

The majority of the Western Australian Rock Lobster that is in prime condition upon reaching the processing facility is exported. Product that is too damaged for export – such as a broken antennae or leg – is often sold domestically to local restaurants.


The Western Rock Lobster is a time sensitive product, and there is typically a time range of 32 hours for the product to reach its final destination. Rock lobsters are exported via air freight.

ACIL Allen has estimated the total export value of the Western Rock Lobster Industry in 2016-17 was \$438 million, based on the assumptions presented in Table 2.4. This value presents the starting point ACIL Allen used to calculate the value of the sectors that make up the supply chain of the Industry.

TABLE 2.4 EXPORT ASSUMPTIONS

Input		Value	Source
E1	Quota	6,300 tonnes	Regulation
E2	Average export price	55 USD/kg	Consultation
E3	Average USD / AUD exchange rate	0.79 USD / AUD	RBA (2014 to 2017 average)
A	Total export value	\$438,001,587	(E1*E2)/E3

SOURCE: ACIL ALLEN CONSULTING



3

SECTOR PROFILE

The Industry's economic contribution will be estimated as the aggregate of the four key sectors presented in this section and the consumption expenditure induced by the incomes earned by those operating in the Industry. The sector profiles are developed by tracing back the value chain from the export points to the ocean. The starting point of this valuation is the current export value of the total quota. It is assumed that processors use this amount to pay the beach price to the harvesters, cover their costs and generate a profit. Harvesters then pay for their inputs (including labour) and retain the remaining amount as an operating surplus and mixed income.

ACIL Allen's primary source of information and market intelligence was obtained through the stakeholder consultation process, background reports and desktop research. Where possible, this market information was referenced against publicly available statistics (predominately from the ABS).

In preparing this report, ACIL Allen was provided with the financial information of five anonymous boat operators which was then aggregated and averaged so as to ensure that individual information was not disclosed.

In order to ensure comparability with other publications and future research, activities are allocated to the standard ABS industry classifications.

3.1 Processed seafood manufacturing

The ABS considers Processed Seafood Manufacturing as processing fish or other seafoods, where the processes include skinning or shelling, grading, filleting, boning, crumbing, battering and freezing of the seafood. This class also includes operating vessels which gather and process fish or other seafoods.

The starting point of this valuation is the current export value of the total quota presented in Table 2.4. This figure represents the total revenue of the processors which the ABS categorises as part of the Processed Seafood Manufacturing sector.

Live lobsters are of course the key input to this sector, with the processors paying fishers what is termed the **beach price**. Based on the current quota and the average beach price over the past 12 months, the total product value is just under \$389 million. As is the case with most commodities markets, the beach price for lobsters is subject to the demand and supply conditions at a particular time. The other key inputs are:

- **road transport:** which ACIL Allen estimated based on the number of trucks required by the sector and distance travelled derived in Table 2.2; and
- **wages:** which ACIL Allen estimated based on the number of employees required for processing and truck driving by the sector presented in Table 2.2 and Table 2.3.

TABLE 3.1 PROCESSED SEAFOOD MANUFACTURING ASSUMPTIONS

	Input	Value	Source
P1	Beach price	62 AUD/kg	GFC website and consultation
P2	Transport cost	\$1,439,622	ACIL Allen research
P3	Wages paid	\$16,332,750	ACIL Allen research
P4	Other inputs and operating surplus	\$31,619,577	A-B-P2-P3
B	Total product value	\$388,609,639	P1*E1

Note: Beach price sourced from: <https://www.brolos.com.au/beach-price/>

SOURCE: ACIL ALLEN CONSULTING

3.2 Fishery

The ABS considers Fishing as the catching of rock lobsters or crabs from their natural habitats of ocean or coastal waters, using baited pots.

The Fishery sector provides the key input to the processors. ACIL Allen estimates that the annual total product value was just under \$389 million in 2016-17. This figure represents the total revenue of the licence owners and harvesters which the ABS categorises as part of the Rock Lobster and Crab Potting sector.

In addition to the **boat-related maintenance and wage costs** presented in Table 2.1, the Fishery sector's key inputs are **boat replacements**. Reflecting feedback through stakeholder consultation, ACIL Allen estimated that on average six boats would be replaced each year, which is calculated by dividing the total number of fishing boats (226) by the average maximum age of a vessel (35 years). ACIL Allen has assumed that two of the replacement boats are "new builds" and that the remaining four are purchased from other industries and then modified for lobster fishing. While the maximum age of a vessel varies, stakeholder consultation found that none of the boats referenced exceeded the age of 25 years.

A small share of product is assumed to be used by harvesters for sales in their own restaurants. These costs are calculated on an opportunity cost basis and therefore linked to the beach price. This cost item is referred to as **internal sales to food services**.

The economic contribution of **fuel and gear costs and incomes paid** will be assessed using the relevant sector specific I-O table industries. Boat servicing, purchasing of new boats and boat modifications will be the basis of assessment of the fishery sector's contribution to the **Boat Building** sector (Section 3.3) and internal sales for food services are part of the **Tourism** sector's contribution (Section 3.4). Licence holder income will be added to the **consumption** estimate (Section 3.5).

Bait cost and 2nd hand boat purchasing do not add value to the Western Australian economy as the former is predominantly imported from New Zealand and the latter is considered to be a transfer within the State's economy.

TABLE 3.2 FISHERY DIRECT IMPACT

Input	Value	Source
F1 Crew cost	\$50,661,748	Consultation
F2 Fuel	\$15,750,000	Consultation
F3 Gear	\$10,710,000	Consultation
F4 Bait (imported)	\$11,340,000	Consultation
F5 Boat servicing	\$17,038,248	ACIL Allen extrapolation
F6 Boat purchasing (new)	\$8,000,000	ACIL Allen extrapolation
F7 Boat purchasing (2 nd hand)	\$4,902,857	ACIL Allen extrapolation
F8 Modification of 2 nd hand purchases	\$1,225,714	ACIL Allen extrapolation
F9 Internal sales to food services	\$771,051	ACIL Allen extrapolation
C License holder income	\$268,210,020	B-F1-F2-F3-F4-F5-F6-F7-F8-F9

SOURCE: ACIL ALLEN CONSULTING

3.3 Boat building and servicing

The ABS considers Boat Building and Servicing as being engaged in manufacturing or repairing vessels of under 50 tonnes.

The Boat Building and Servicing (the Boat Building) sector supplies harvesters with “new builds” and services the existing fleet. The revenue of the Western Australian boat building and repair services sector can be estimated as the sum of **boat servicing, purchasing of new boats and boat modifications costs** of the fishery sector. This amount is estimated to be just over \$26.2 million in an average year.

This estimate is the lower limit of the contribution of boat manufacturing that can be attributed to the Industry. Since there are numerous examples where a boat building business was originally set up to supply the Industry and has since diversified into supplying a wide range of national and international clients, it could be argued that since these businesses would not exist without the Industry, their entire revenue could be attributed to the Industry. **Box 3.1** presents a case study of such a business and provides an overview of this business’s economic footprint.

The economic contribution of the Boat Building sector will be assessed using the sector’s input requirements specified in the I-O table.

TABLE 3.3 BOAT BUILDING DIRECT IMPACT

Input	Value	Source
B1 Inputs and profits from lobster industry	\$26,263,962	F5+F6+F8

SOURCE: ACIL ALLEN CONSULTING

BOX 3.1 CASE STUDY: DONGARA MARINE AND SOUTHERLY DESIGNS

Dongara Marine and Southerly Designs are two Dongara based firms that provide specialist marine vessel servicing, design and advice. Dongara Marine emerged in 1975, initially to service the cray fishing industry boats. Southerly Designs emerged in 1997, in its early years designing majority of the lobster fishing boats in the Industry throughout the 1980's and 1990's.

Both Dongara Marine and Southerly Designs have their roots in the Western Rock Lobster fishing industry, and have been able to expand and develop capability through the service of this industry. The firms have been able to leverage their experience in order to expand and develop into other non-Western Rock Lobster vessel specialities of naval architecture and ship building. Anecdotally, Western Rock Lobster fishing boats are highly versatile "sea trucks", and as such servicing the industry regularly provides scope for both firms to be intimately acquainted with design requirements and limitations for such vessels in harsh conditions and open ocean environments.

Built off the back of the Western Rock Lobster, Southerly Designs has used its experience to design utility vessels, charter and tourist vessels, pilot boats, military craft, leisure craft and marine lifting equipment. Southerly now also designs boats for the international market and has partners in Singapore, Mexico and Vietnam, as well as designing lobster vessels for other states in Australia.

Not only did the Western Rock Lobster Industry provide Southerly and Dongara a springboard for growth, the capabilities developed and consequent diversification have served as a buffer for both firms against the economic ups and downs in each of its service industries.

Both firms seek to stay aligned with their Western Rock Lobster Industry roots, whilst continuing to develop their expertise and expand their in-house processing capabilities. Anecdotally, this expertise will ideally provide further avenues for expansions into defence and sea rescue oriented vessels.

SOURCE: ACIL ALLEN CONSULTATION WITH INDUSTRY

3.4 Tourism

During stakeholder consultation, ACIL Allen was advised that one of the processors had set up its headquarters as a tourist attraction by offering tours of the facilities and offering lobster-based meals in the adjoining restaurant. Based on the visitor estimates provided to ACIL Allen during consultation, and the prices charged for tours and meals, the tourism impact of the Industry was calculated in Table 3.4. **Box 3.2** presents a detailed description of this business.

The economic contribution of the Tourism sector will be assessed using the sector's input requirements specified in the I-O table.

TABLE 3.4 TOURISM DIRECT IMPACT

	Input	Value	Source
T1	Accommodation inputs and profits from lobster industry	\$1,229,400	ACIL Allen research
T2	Food services inputs and profits from lobster industry	\$3,500,000	ACIL Allen research

SOURCE: ACIL ALLEN CONSULTING

BOX 3.2 CASE STUDY: THE LOBSTER SHACK

Indian Ocean Rock Lobster formed its processing facility in Cervantes in 2008. Public interest in the facility prompted Indian Ocean to open its doors for small, privately run tours. Since then continual interest in the facility and initiative on behalf of Indian Ocean has seen the steady growth of the tours' popularity and the subsequent birth of the Lobster Shack.

The Lobster Shack is a part of Indian Ocean Rock Lobster and caters to approximately 100,000 tourists annually. The Lobster Shack grew as a result of the popularity of the tour, and today consists of a guided multi-lingual audio described tour, small cinema, a restaurant, a merchandise store as well as a series of water based tours. Tours include lobster pot pulling, seal watching and deep sea fishing charters.

From inception to today, the Lobster Shack has benefitted from its close proximity to the highly popular Pinnacles and Nambung National park. Lake Thetis, a unique saline coastal lake, is also located in the vicinity. As a result, Cervantes has been and continues to be well positioned to service large international and domestic tour groups and visitors. Given the proximity of the Lobster Shack to the Pinnacles, which is visited by approximately 250,000 visitors annually, this provides an ongoing opportunity to provide food and accommodation for visitors to the site.

Increasingly as the Western Rock Lobster's reputation as a premium product from a pristine environment has seen – for some visitors – attraction priorities flip.

Looking forward, Indian Ocean Rock Lobster is actively investing further in the Lobster Shack and seeks to enhance the tourism offering by expanding its entertainment options and the overall customer experience.

SOURCE: ACIL ALLEN CONSULTATION WITH INDUSTRY

3.5 Household consumption

To this point the assessment of the Industry's economic impact has focussed on the physical inputs required for harvesting and processing. The employment it creates and the associated incomes can be used as the basis for assessing the Industry's social impact: that is, the employment opportunities and wealth created in a number of rural coastal communities.

Based on the analysis presented above, ACIL Allen estimates that the Industry employs approximately 870 FTE positions, generating \$72.5 million in gross wages. The Industry generates a further \$311 million in operating surplus and mixed income. Together, the wages, operating surplus and mixed incomes can be translated into the associated households' demand for goods and services by applying household spending patterns published by the ABS to the net incomes. Net incomes were estimated by deducting the income bracket relevant income tax as well as superannuation and workers' compensation.

The economic contribution of the demand for goods and services will be assessed using the sector's input requirements specified in the I-O table. The community benefits assessment will allocate (shares of) this demand to the key relevant rural coastal communities in order to quantify the Industry's social impact.

TABLE 3.5 CONSUMPTION IMPACT

	Input	Value	Source
C1	Processed seafood manufacturing net income	11,718,665	ACIL Allen research
C2	Fishery: crews and skippers net income	35,408,874	ACIL Allen research
C3	Fishery: license holder income net income	149,290,338	ACIL Allen research
D	Total	196,417,878	ACIL Allen research
E	Taxes etc.	122,087,920	(C+F1+P3)-D

SOURCE: ACIL ALLEN CONSULTING



4

ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY

This section presents the economic contribution of the Western Rock Lobster Industry, which has used the information presented in the previous sections as the critical inputs into ACIL Allen's I-O tables of the WA economy and its regional economies. For further information on ACIL Allen's I-O table and the modelling framework, please see Appendix B.

The economic contribution of the Industry is presented in terms of its contribution to **economic output** (Gross Value Added) and **employment** (FTE jobs), and by **sector** (as defined in Section 3).

4.1 Headline results

The Western Rock Lobster Industry generates hundreds of millions of dollars to the WA economy and its regions each and every year. The economic contribution of the activities directly associated with the Western Rock Lobster Industry and the indirect activities associated with the Industry in 2016-17 is presented in Figure 4.1 below. The economic contribution has been estimated based on the confidential financial information received from Industry proponents on their business, as well as the goods and services they purchase from other industries.

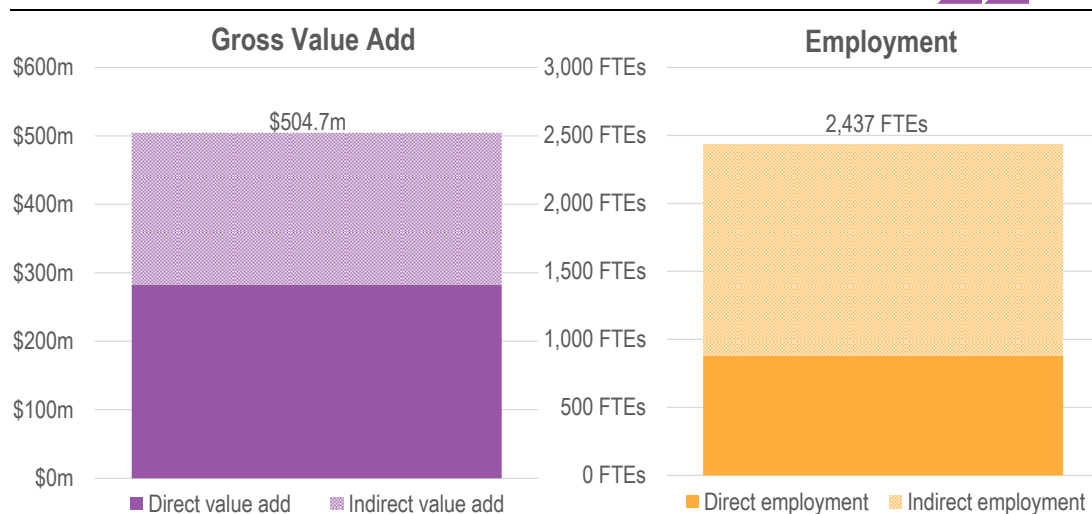
ACIL Allen estimates the Industry accounted for \$282 million of direct economic output across WA in 2016-17, which is the result of the *value added* activities generated in the Industry across the supply chain – from harvesting through to export to market. This level of activity in turn generated a further \$222 million in indirect economic output across WA, primarily in the form of additional consumption spending from the wages and incomes generated by participants in the Industry.

Overall, it is estimated that the **Western Rock Lobster Industry generated \$505 million in direct and indirect economic output in the WA economy in 2016-17**. The implied Industry multiplier is 1.79, which means that for every dollar spent by the Industry in WA, additional spending of \$0.79 is generated across the economy.

In terms of employment, the Industry directly accounted for 878 FTE jobs in 2016-17. A further 1,558 indirect FTE jobs were generated throughout the economy as a result of the activities across the Industry value chain.

Overall, the **Industry accounted for 2,437 direct and indirect FTE jobs in 2016-17**. The implied Industry employment multiplier is 2.77, meaning that for every direct FTE job generated by the Industry in WA, a further 1.77 FTE jobs are generated throughout the economy.

In 2016-17, it is estimated that the Western Rock Lobster Industry generated \$505 million in economic output and 2,437 FTE jobs in the WA economy

FIGURE 4.1 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, 2016-17

SOURCE: ACIL ALLEN CONSULTING

4.2 Contribution by sector

ACIL Allen also estimated the economic contribution of the Industry by the sectors that make up the total Western Rock Lobster Industry (refer to Figure 4.2). The Fishery sector is the largest sector in Gross Value Added terms, accounting for 85 per cent (or \$241 million) of the total direct economic output generated in the Industry. The Processed Seafood Manufacturing sector accounted for the majority of the remaining direct output generated by the Industry (15 per cent or \$41.2 million).

To generate this level of economic output, these sectors in turn require inputs from other sectors that are part of the Industry's overall supply chain, generating indirect value added activity in the WA economy. An additional \$158 million in indirect economic impact was generated in the Fishery sector, \$29.2 million in Processed Seafood Manufacturing, \$28.5 million in Boat Building, and \$6.6 million in Tourism activities.

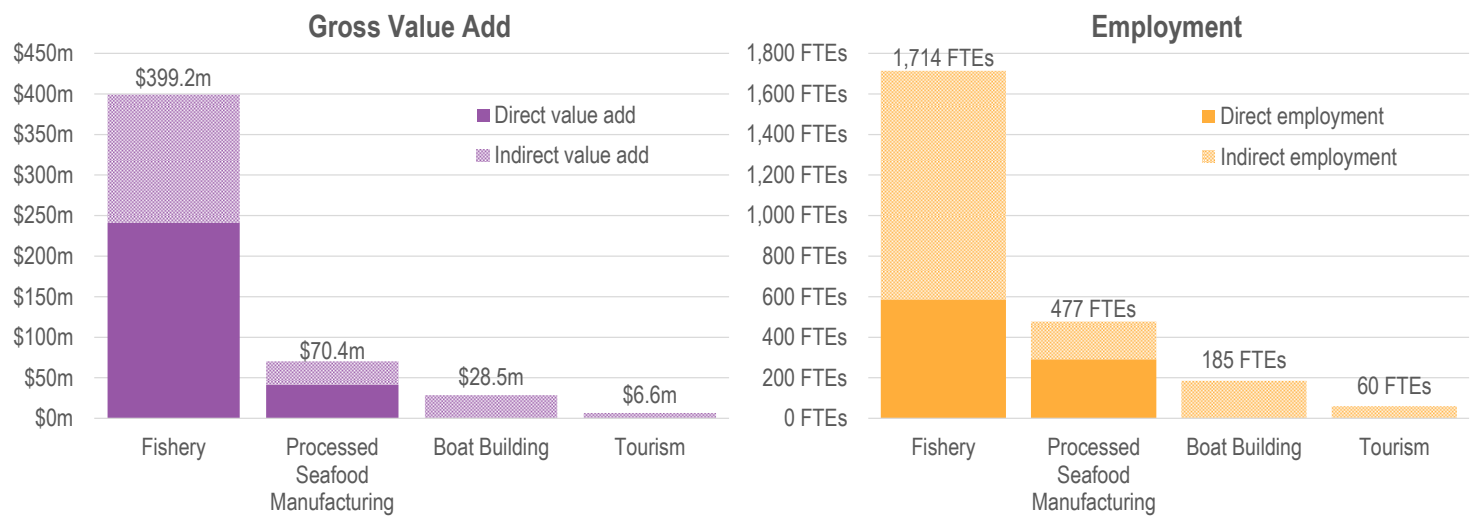
Across the Industry supply chain, the **Fishery** sector generated the largest direct and indirect economic impact (\$399 million), with significant contributions in **Processed Seafood Manufacturing** (\$70.4 million), **Boat Building** (\$28.5 million) and **Tourism** (\$6.6 million) in 2016-17.

In terms of employment, the **Fishery sector was the largest employing sector in the Industry**, with 587 FTE jobs directly employed in the sector, and a further 1,127 FTE jobs indirectly employed in the Fishery sector. In total, there were **1,714 direct and indirect FTE jobs created in the Fishery sector in 2016-17**.

The Processed Seafood Manufacturing sector is the second largest employer across the Industry supply chain, directly employing 291 FTE jobs, with a further 186 FTE jobs indirectly created as a result of the activities generated in the Industry. In total, there were **477 FTE jobs created in the Processed Seafood Manufacturing sector** as a result of the Western Rock Lobster Industry.

The Industry also generated scores of jobs in **Boat Building (185 FTE jobs)** and **Tourism (60 FTE jobs)** sectors in 2016-17.

Across the Industry supply chain, the Fishery sector generated the largest economic impact (\$399 million), with significant contributions in Processed Seafood Manufacturing (\$70.4 million), Boat Building (\$28.5 million) and Tourism (\$6.6 million) in 2016-17.

FIGURE 4.2 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY SECTOR, 2016-17

SOURCE: ACIL ALLEN CONSULTING



5

SENSITIVITY ANALYSIS

ACIL Allen's study has focussed on understanding the economic contribution of the Western Rock Lobster Industry, based on an assumed export price of A\$69.52 per kilogram in 2016-17. In order to assess the degree to which the Industry changes depending on the export price or the quantity exported, ACIL Allen has modelled the following scenarios:

- **Low price scenario:** export value of Western Rock Lobsters decreases to A\$63.20 per kilogram;
- **High price scenario:** export value of Western Rock Lobsters increases to A\$94.81 per kilogram;
- **Low export volume scenario:** export quantity of Western Rock Lobsters decreases to 5,500 tonnes; and
- **High export volume scenario:** export quantity of Western Rock Lobsters increases to 8,800 tonnes.

The price scenarios have been selected as they represent the most recent low and high export prices achieved by the Industry. The quantity scenarios have been selected as they represent realistic bounds for the contraction or growth of the total catch in the Industry.

The results under each scenario are detailed below.

5.1 Low Price Scenario

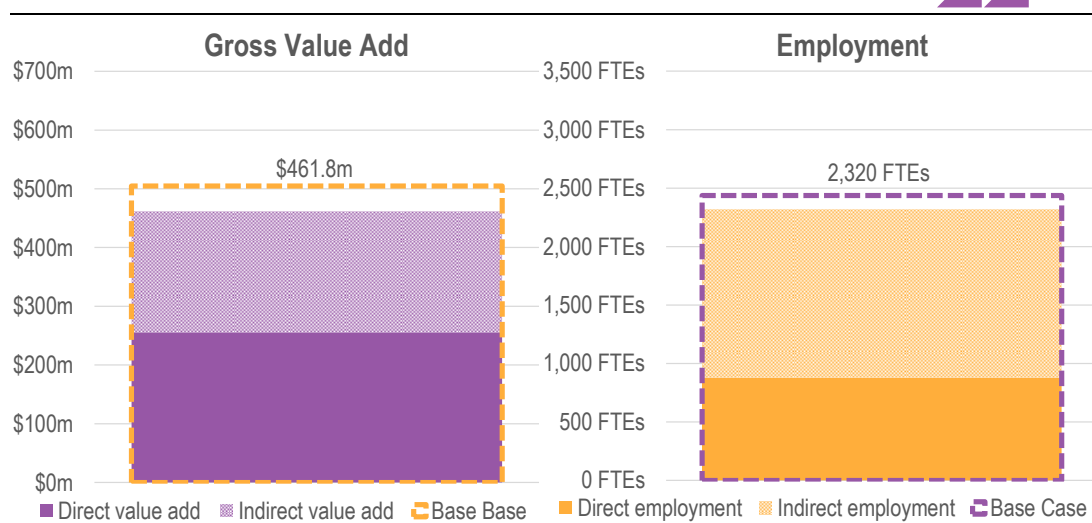
Under a lower price scenario, the primary impact is in the form of the wages paid to employees that are tied to the value of Western Rock Lobsters and the profits generated by the Industry.

Relative to the base case, it is estimated the **Industry's total output, in Gross Value Added terms, decreases by eight per cent to \$462 million under a low price scenario** (refer to Figure 5.1).

Lower wages and profits generated in the Industry primarily impacts on the broader economy through lower levels of consumption relative to the base case.

Lower levels of household consumption in turn impacts on employment, with **the Industry's total contribution to employment in WA estimated to fall by five per cent to 2,320 FTE jobs**.

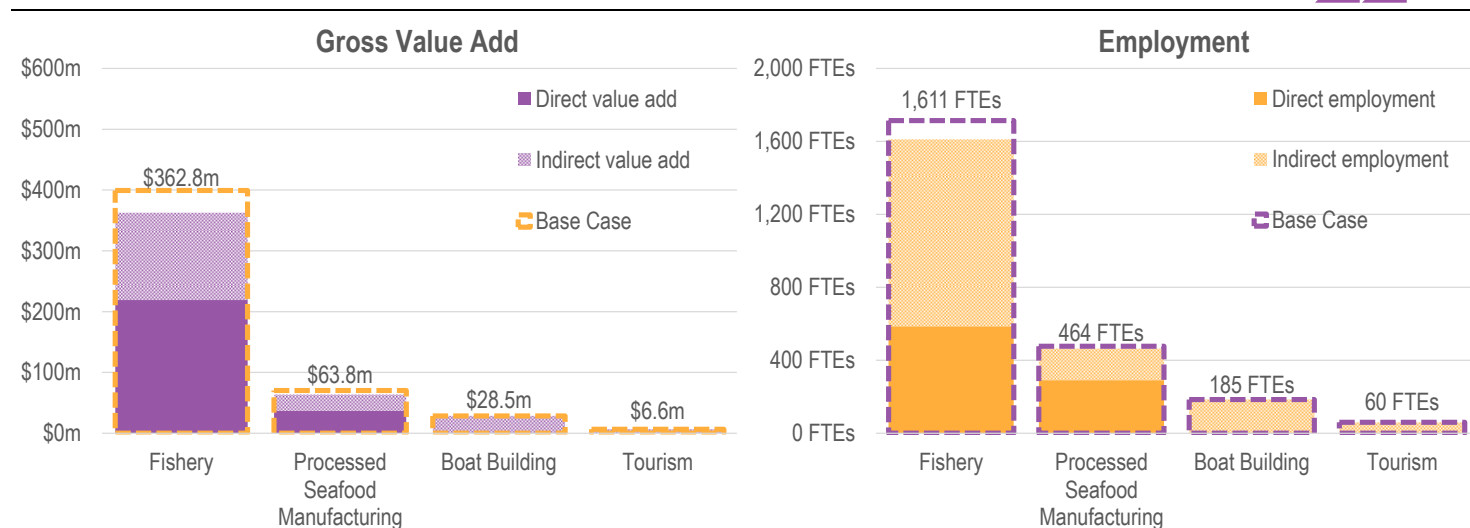
Relative to the base case, it is estimated the Industry's total output will fall by eight per cent to \$462 million, and employment will fall by five per cent to 2,320 FTE jobs under a low price scenario

FIGURE 5.1 LOW PRICE SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, 2016-17

SOURCE: ACIL ALLEN CONSULTING

The impact of lower wages and profits are further represented in Figure 5.2, with the Fishery sector's Gross Value Added estimated to fall by nine per cent (to \$363 million), and the Processed Seafood Manufacturing sector estimated to fall by nine per cent (to \$63.8 million).

The consumption impact of lower wages and profits reduces employment levels in the Fishery sector by six per cent to a total of 1,611 FTE jobs and in the Processed Seafood Manufacturing Industry by three per cent to a total of 464 FTE jobs, but does not impact on employment in any other sectors of the Industry.

FIGURE 5.2 LOW PRICE SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY SECTOR, 2016-17

SOURCE: ACIL ALLEN CONSULTING

5.2 High Price Scenario

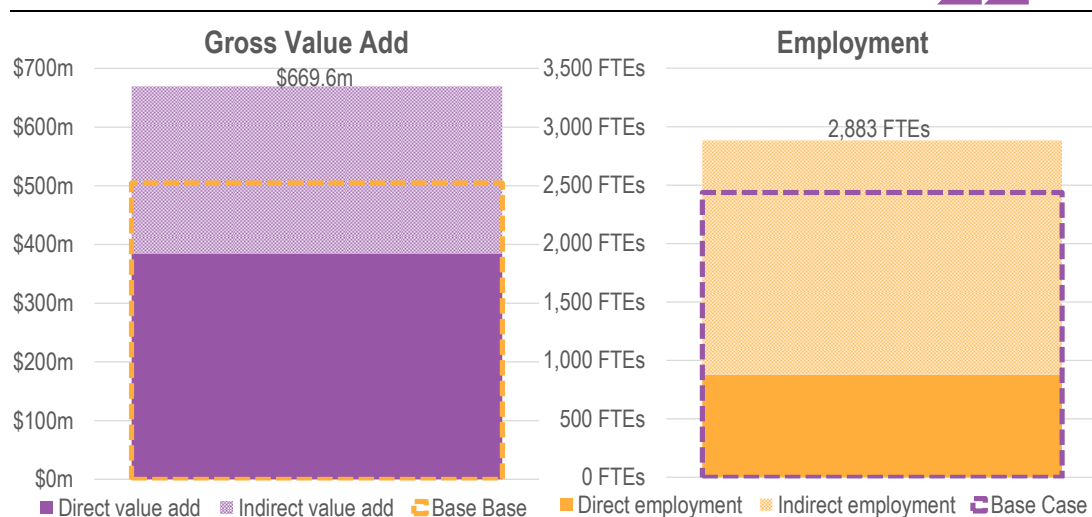
Under a higher price scenario, the primary impact will also be in the form of the wages paid to employees that are tied to the value of Western Rock Lobsters and the profits generated by the Industry.

Relative to the base case, it is estimated the Industry's total output will increase by 33 per cent to \$670 million, and employment will rise by 18 per cent to 2,883 FTE jobs under a high price scenario

Relative to the base case, it is estimated the **Industry's total output, in Gross Value Added terms, increases by 33 per cent to \$670 million under a high price scenario** (refer to Figure 5.3). Higher wages and profits generated in the Industry primarily impacts on the broader economy through higher levels of consumption relative to the base case.

Higher levels of household consumption in turn impacts on employment, with the **Industry's total contribution to employment in WA estimated to increase by 18 per cent to 2,883 FTE jobs**.

FIGURE 5.3 HIGH PRICE SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, 2016-17

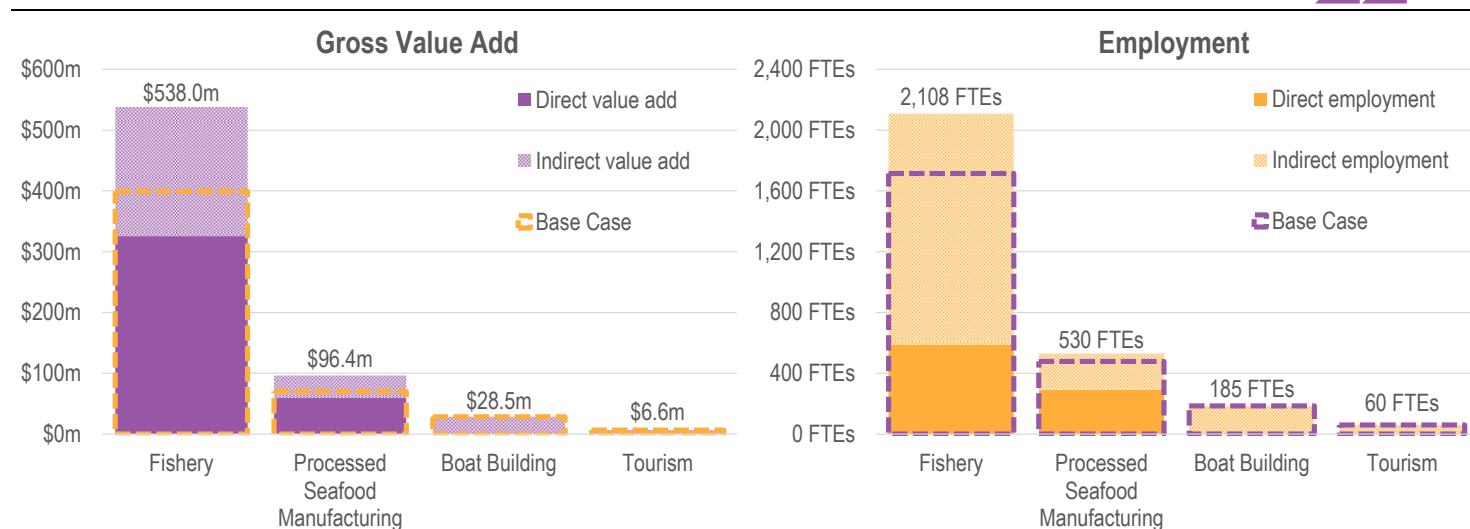


SOURCE: ACIL ALLEN CONSULTING

The impact of higher wages and profits are further represented in Figure 5.4, with the Fishery sector's Gross Value Added estimated to increase by 35 per cent (to \$538 million), and the Processed Seafood Manufacturing sector estimated to increase by 37 per cent (to \$96.4 million).

The consumption impact of higher wages and profits increases employment levels in the Fishery sector by 23 per cent to a total of 2,108 FTE jobs and in the Processed Seafood Manufacturing Industry by 11 per cent to a total of 530 FTE jobs, but does not impact on employment in any other sectors of the Industry.

FIGURE 5.4 HIGH PRICE SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY SECTOR, 2016-17



SOURCE: ACIL ALLEN CONSULTING

5.3 Low Export Volume Scenario

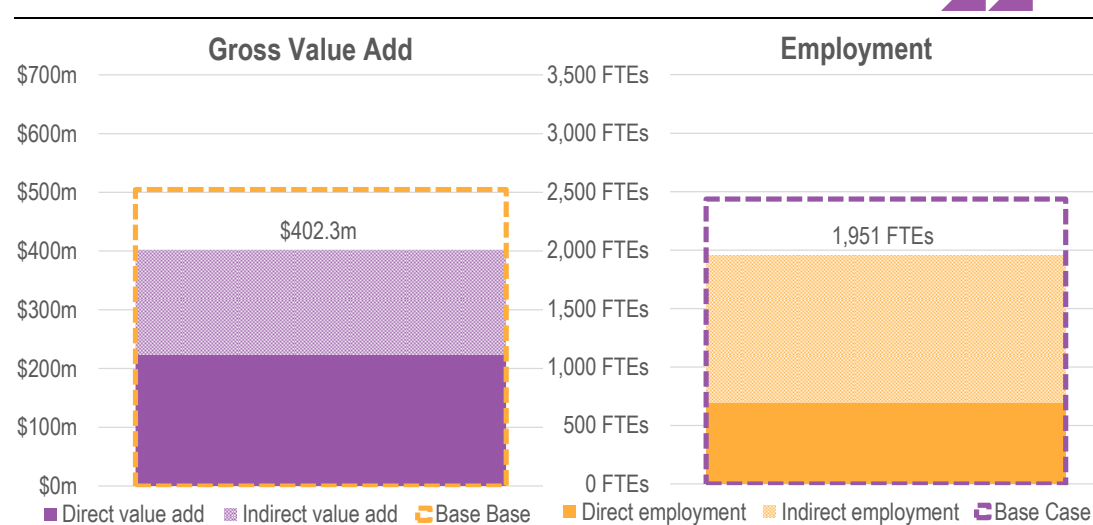
Under a low export volume scenario, the impacts will be in the form of the wages paid to employees that are tied to the quantity of Western Rock Lobsters farmed and the profits generated by the Industry. Additionally, the number of boats, pots, trucks and gear required will reduce in the low quantity scenario.

Relative to the base case, it is estimated the Industry's total output will fall by 20 per cent to \$402 million, and employment will fall by 20 per cent to 1,951 FTE jobs under a low export volume scenario

Relative to the base case, it is estimated the **Industry's total output, in Gross Value Added terms, decreases by 20 per cent to \$402 million under a low quantity scenario** (refer to Figure 5.3). Lower wages and profits generated in the Industry primarily impacts on the broader economy through lower levels of consumption relative to the base case.

Lower levels of household consumption in turn impacts on employment, with the **Industry's total contribution to employment in WA estimated to decrease by 20 per cent to 1,951 FTE jobs**.

FIGURE 5.5 LOW EXPORT VOLUME SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, 2016-17



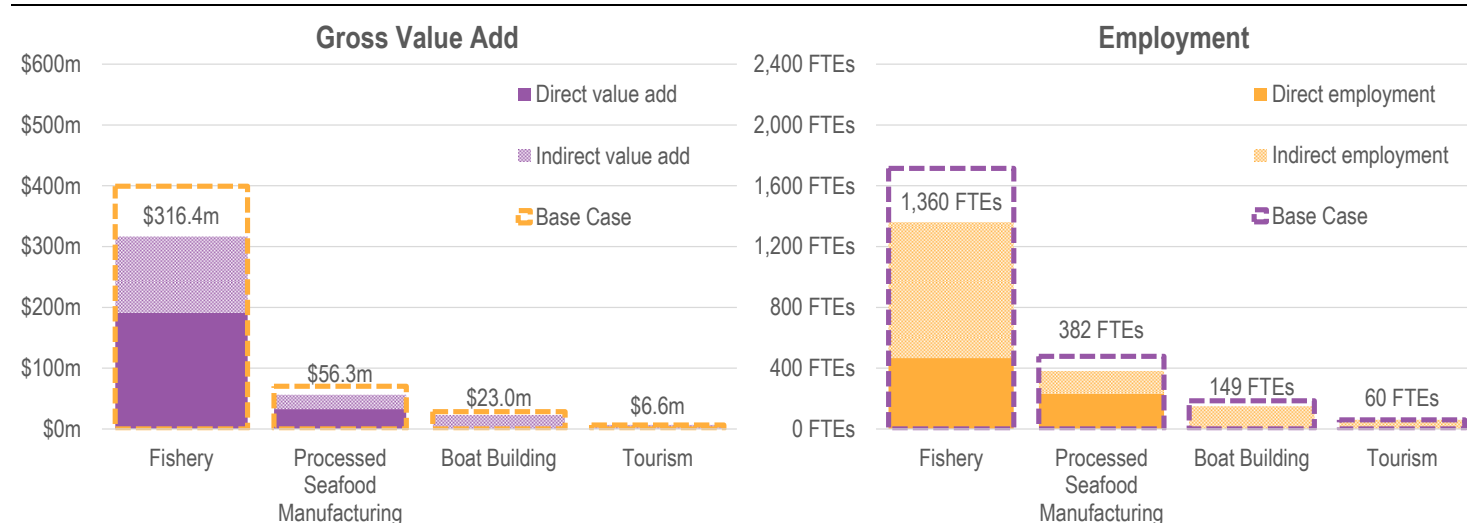
SOURCE: ACIL ALLEN CONSULTING

The impact of lower wages and profits are further represented in Figure 5.4, with the Fishery sector's Gross Value Added estimated to decrease by 21 per cent (to \$316 million), and the Processed Seafood Manufacturing sector estimated to decrease by 20 per cent (to \$56 million).

Further, due to a lower number of number of boats, pots, trucks and gear required, the Boat Building sector is also estimated to decrease by 19 per cent to \$23 million.

The consumption impact of lower wages and profits lowers employment levels in the Fishery sector by 21 per cent to a total of 1,360 FTE jobs, by 20 per cent to a total of 382 FTE jobs in the Processed Seafood Manufacturing Industry and by 19 per cent to 149 FTE jobs in the Boat Building sector.

FIGURE 5.6 LOW EXPORT VOLUME SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY SECTOR, 2016-17



SOURCE: ACIL ALLEN CONSULTING

5.4 High Export Volume Scenario

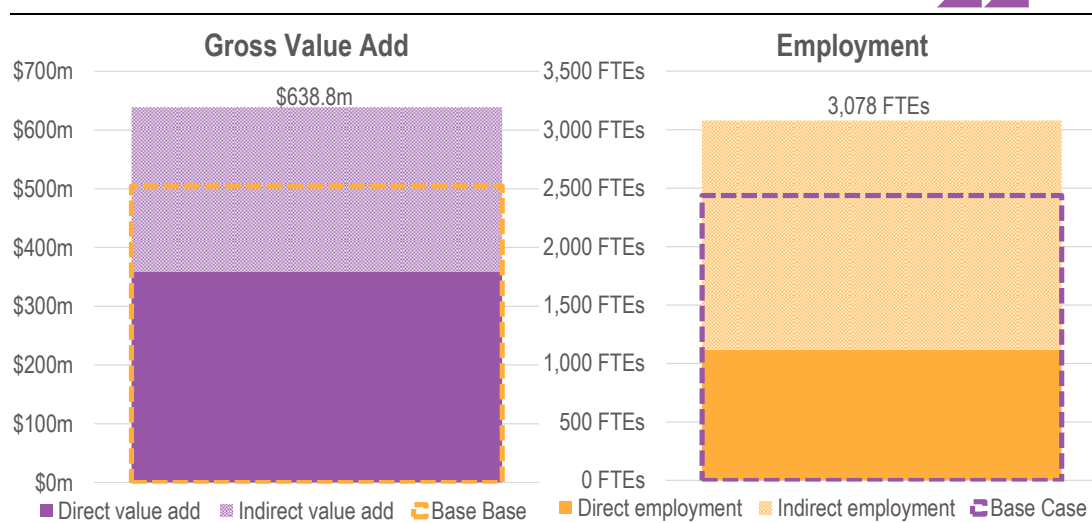
Under a high quantity scenario, the primary impact will also be in the form of the wages paid to employees that are tied to the quantity of Western Rock Lobsters farmed and the profits generated by the Industry. Additionally, the number of boats, fuel, pots, trucks and gear required will increase in the high quantity scenario in order to handle the increased volume of product.

Relative to the base case, it is estimated the **Industry's total output, in Gross Value Added terms, increases by 27 per cent to \$639 million under a high quantity scenario** (refer to Figure 5.3). Higher wages and profits generated in the Industry primarily impacts on the broader economy through higher levels of consumption relative to the base case.

Higher levels of household consumption in turn impacts on employment, with the **Industry's total contribution to employment in WA estimated to increase by 26 per cent to 3,078 FTE jobs**.

Relative to the base case, it is estimated the Industry's total output will increase by 27 per cent to \$639 million, and employment will rise by 26 per cent to 3,078 FTE jobs under a high export volume scenario

FIGURE 5.7 HIGH EXPORT VOLUME SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, 2016-17



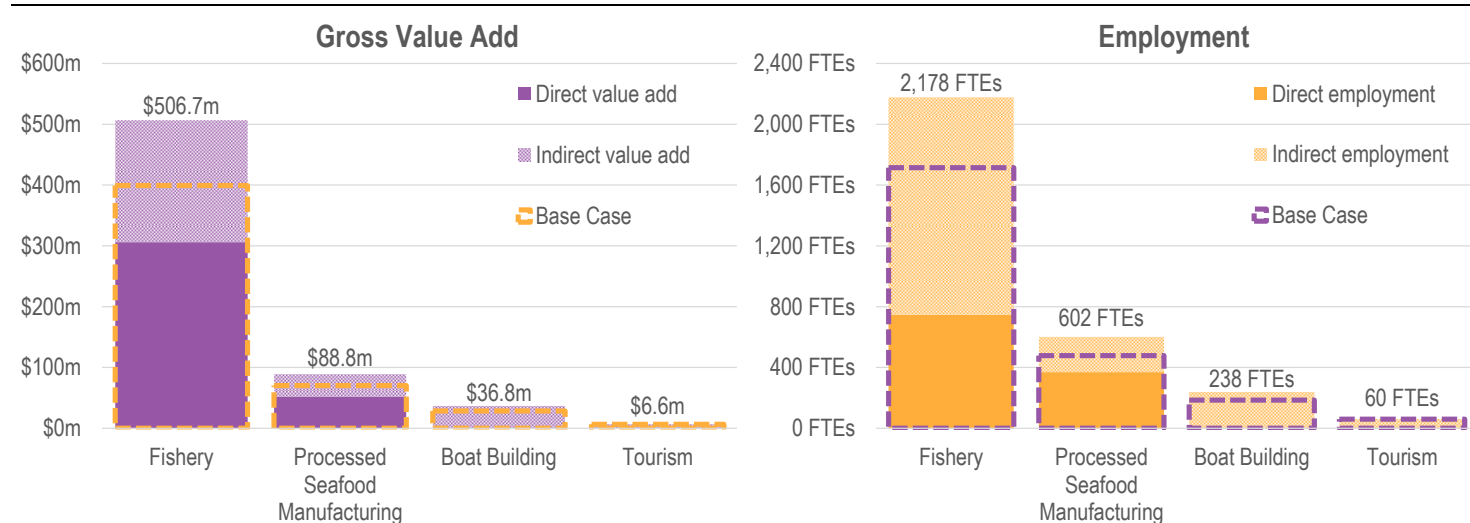
SOURCE: ACIL ALLEN CONSULTING

The impact of greater wages and profits are further represented in Figure 5.4, with the Fishery sector's Gross Value Added estimated to increase by 27 per cent (to \$507 million), and the Processed Seafood Manufacturing sector estimated to increase by 26 per cent (to \$88.8 million).

Further, due to a higher number of number of boats, pots, trucks and gear required, the Boat Building sector is also estimated to increase by 29 per cent to \$36.8 million.

The consumption impact of higher wages and profits increases employment levels in the Fishery sector by 27 per cent to a total of 2,178 FTE jobs, by 26 per cent to a total of 602 FTE jobs in the Processed Seafood Manufacturing Industry and by 29 per cent to 238 FTE jobs in the Boat Building sector.

FIGURE 5.8 HIGH EXPORT VOLUME SCENARIO, ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY SECTOR, 2016-17



SOURCE: ACIL ALLEN CONSULTING



6

REGIONAL AND COMMUNITY CONTRIBUTIONS

This section estimates the community and economic benefits arising from the Western Rock Lobster Industry at a regional and town level. Two major regions were developed for the purposes of this study; the Northern Zone and Southern Zone.

The economic contribution the Industry makes to WA is spread from Kalbarri in the north to Busselton in the State's south. The majority of the Industry's economic contribution is concentrated around the Perth metropolitan area, with significant economic opportunities generated in the towns between Geraldton and Lancelin (refer Figure 6.1).

6.1 Economic contribution of the Northern Zone

The Northern Zone delineates all towns north of Ledge Point, and includes the following towns:

- Kalbarri;
- Geraldton;
- Dongara/Port Denison;
- Leeman;
- Jurien Bay;
- Cervantes; and
- Lancelin.

Census data was used in order to obtain relevant population data in these regions, using the ABS state suburbs and the 2011 data sets. The relevant series from the 2016 Census were not released at the time of this study. Yanchep, Ledge Point, Green Head, Exmouth, Horrocks and South Carnarvon were not included in this analysis due to either limited industry activity in these towns as indicated by the Census data and/or their population was too small to extract a robust community profile from Census data.

Because participation in the Census is not 100 per cent, population figures were adjusted by applying an adjustment factor derived by comparing estimated residential population (ABS catalogue 3101) with Census results at a local government area (LGA) level. The five and 10 year average housing growths were calculated using CoreLogic data. As ACIL Allen only holds this data at an LGA level, communities that are in the same LGA show the same growth rates.

FIGURE 6.1 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, BY LOCATION



SOURCE: ACIL ALLEN CONSULTING

Gross Town Product is calculated using ACIL Allen's I-O table framework. It can be interpreted as an estimate of the total economic activity within the town. The Gross Town Product is estimated by determining share of employees in a town into each of the 114 industries ACIL Allen's I-O modelling framework uses as a proportion of those in the LGA, and then assigning these to the known value of the industry in that area. The Industry's economic contribution was allocated to the towns based on the number of boats by town presented in Section 2.

The results presented below are for the Northern Zone overall, and then each of the key towns (as presented above) that make up the Northern Zone.

6.1.1 Headline results

ACIL Allen estimates the Industry accounted for \$106 million of direct economic output across the Northern Zone in 2016-17 (refer to Figure 6.2), which is the result of the value added activities generated in the Industry across the value chain from harvesting through to export to market. This level of activity in turn generated a further \$16.2 million in indirect economic output across the Northern Zone, primarily in the form of additional spending from the Boat Building and Tourism sectors of the Industry's supply chain.

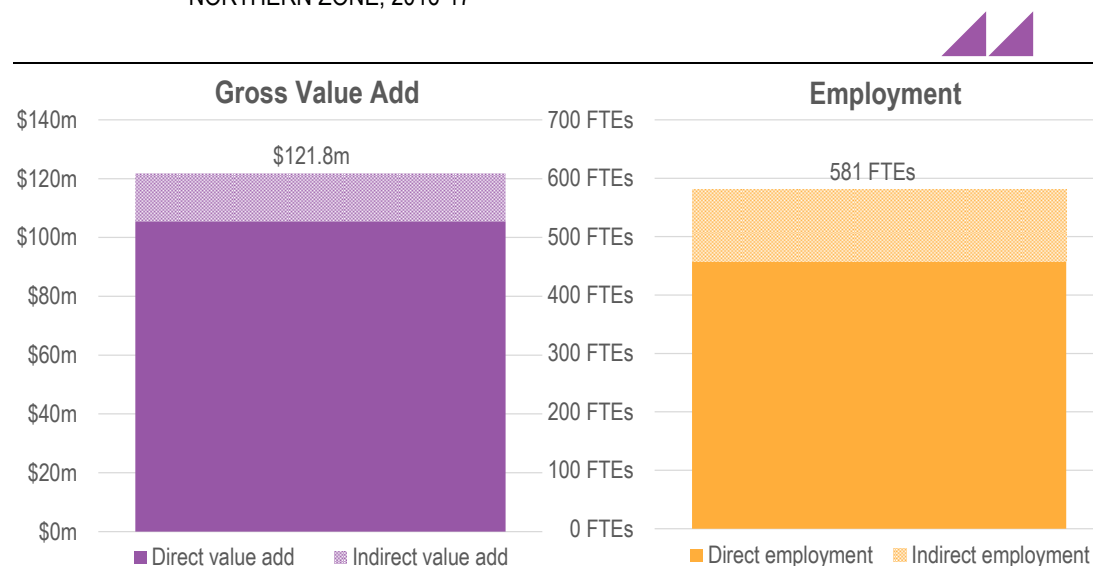
Overall, it is estimated that the Western Rock Lobster Industry generated \$122 million in direct and indirect economic output in the Northern Zone in 2016-17. The implied Industry multiplier is 1.15, which means that for every dollar spent by the Industry in the Northern Zone, additional spending of \$0.15 is generated across the Northern Zone economy.

In terms of employment, the Industry directly accounted for 457 FTE jobs in 2016-17. A further 124 indirect FTE jobs were generated throughout the Northern Zone's economy as a result of the activities across the Industry value chain.

Overall, the Industry accounted for 581 direct and indirect FTE jobs in 2016-17. The implied Industry employment multiplier is 1.27, meaning that for every direct FTE job generated by the Industry in the Northern Zone, a further 0.27 FTE jobs are generated throughout the Northern Zone's economy.

It is estimated that the Western Rock Lobster Industry generated \$123 million in economic output and 586 FTE jobs in the Northern Zone in 2016-17

FIGURE 6.2 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, NORTHERN ZONE, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.2 Contribution by sector

The Fishery sector is the largest sector in Gross Value Added terms, accounting for 89 per cent (or \$94.1 million) of the total direct economic output generated in the Industry (refer to Figure 6.3). The Processed Seafood Manufacturing sector accounted for the majority of the remaining direct output generated by the Industry (11 per cent or \$11.4 million).

To generate this level of economic output, these sectors in turn require inputs from other sectors that are part of the Industry's overall supply chain, generating indirect value added activity in the Northern Zone. An additional \$10.4 million in indirect economic impact was generated in the Boat Building sector, \$4.5 million in the Tourism sector, \$1 million in the Fishery sector and \$300,793 in Processed Seafood Manufacturing sector.

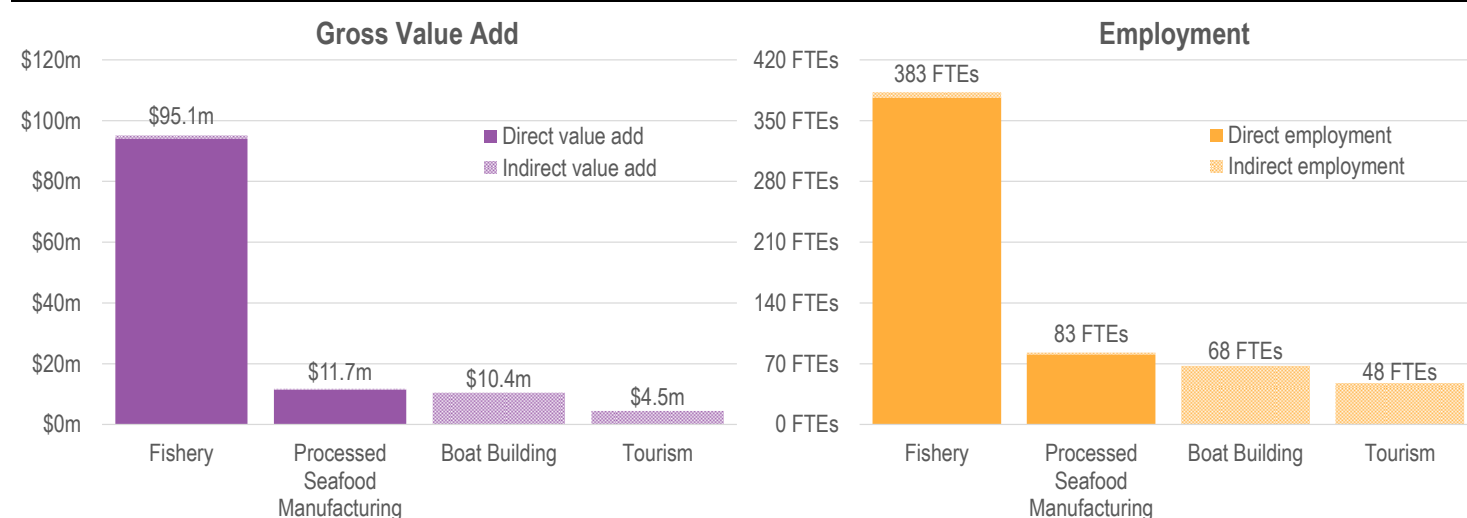
Across the Industry supply chain, the Fishery sector generated the largest direct and indirect economic impact (\$95.1 million), with significant contributions in Processed Seafood Manufacturing (\$11.7 million) and Boat Building (\$10.4 million) and Tourism (\$4.5 million) in 2016-17.

In terms of employment, the Fishery sector was the largest direct employing sector in the Industry, with 377 FTE jobs directly employed in the sector, and a further six FTE jobs indirectly employed in the Fishery sector. In total, there were 383 direct and indirect FTE jobs created throughout the Northern Zone in the Fishery sector in 2016-17.

The Processed Seafood Manufacturing sector is the second largest direct employer across the Industry supply chain, directly employing 81 FTE jobs, with a further two FTE jobs indirectly created as a result of the activities generated in the Industry. In total, there were 83 FTE jobs created across the Northern Zone in the Processed Seafood Manufacturing sector as a result of the Western Rock Lobster Industry.

The Industry also generated scores of jobs in Boat Building sector (68 FTE jobs) and Tourism sector (48 FTE jobs) in 2016-17.

FIGURE 6.3 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, NORTHERN ZONE, BY SECTOR, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.3 Kalbarri

Regional profile

Kalbarri is situated 592 km north of Perth, at the mouth of the Murchison River. The town is both a fishing and tourist town, given its location relative to the Kalbarri National park, Hutt Lagoon and its proximity to where humpback whales migrate. The coast of Kalbarri is home to limestone reefs and headlands, and shipwrecks play a part of the town's history. In 1942, the first permanent residents of Kalbarri built a camp in the area and with them brought the first "lobster boat". Seven years later, after other fisherman followed suit, the town was officially gazetted as "the Mouth of the Murchison" and renamed two years later to Kalbarri¹.

Whilst the Western Rock Lobster fishery has been an important part of the tapestry of Kalbarri, and that the fishery provided the impetus to generate infrastructure that has allowed the town to be self-sufficient, even if the fishery no longer sways the town's survival¹.

Kalbarri's population has remained relatively stable over the past decade, with the estimated residential population reaching 1,645 in 2016, compared to a population of 1,628 in 2006. Over the same period, the median age has matured from 41 in 2006 to 51 in 2016. Average household sizes have shrunk from 2.3 to 2.1 persons per household, reflecting an ageing population as less households support children and young adults.

The workforce in Kalbarri in 2011 was 681 FTE's. The median weekly personal income in the area has also remained relatively stable over the last ten years, when adjusted for CPI. The median weekly personal income was \$486 per week in 2006, relative to \$493 per week in 2016. Consistent with



trends across WA, the average house prices have contracted over the five years to 2016 (fallen by three per cent to \$312,500).

Relative to the town median income, those that identify themselves in the Census as Rock Lobster fishers have a median income of \$1,268 per week, which is 157 per cent higher than the median personal weekly income for the area, when adjusted for CPI.

Based on ACIL Allen's I-O modelling it is estimated that Kalbarri's gross town product was \$67 million in 2016-17.

Economic contribution

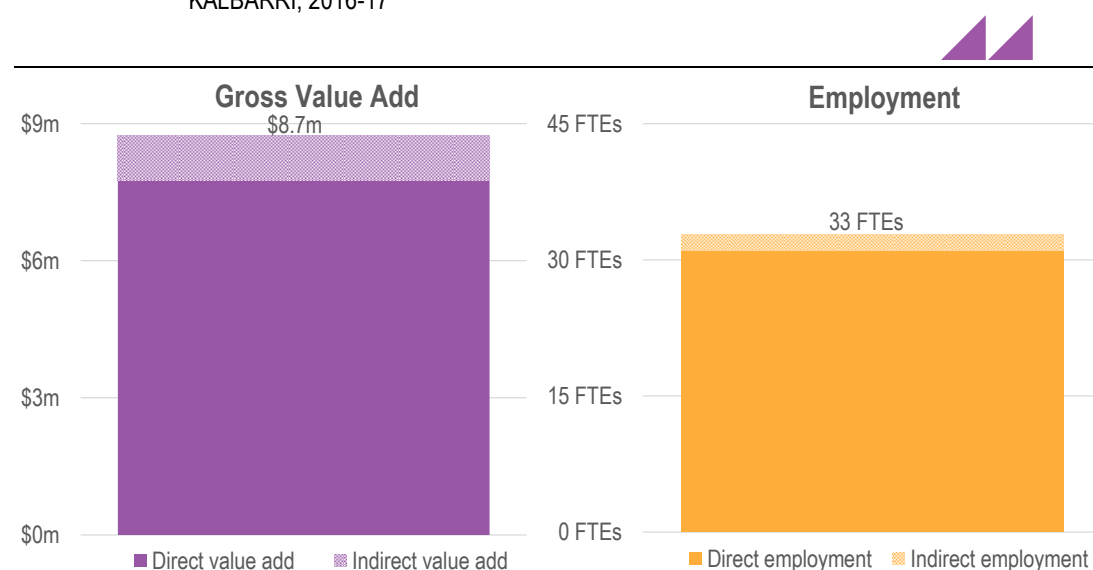
There are approximately 12 boats operating near Kalbarri (based on the assumptions presented in Section 2.1) which account for approximately five per cent of the total Western Australian Rock Lobster annual catch.

Figure 6.4 presents the economic contribution the Industry made to the Kalbarri economy in 2016-17. The Industry accounted for \$7.8 million in direct economic impact in the area, which was derived mostly from the fishery sector itself. The direct output generated indirect economic output of \$1 million to Kalbarri, implying an output multiplier of 1.13.

Based on Kalbarri's Gross Town Product of \$65 million in 2016-17, ACIL Allen estimates that the Western Rock Lobster Industry accounted for approximately 13 per cent of the town's economy in 2016-17.

In employment terms the Industry accounted for 31 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of two indirect FTE job, for a total of 33 FTE jobs in 2016-17, implying an employment multiplier of 1.06 in the area. It is estimated that the Industry accounted for 4.8 per cent of the jobs in the town in 2016-17.

FIGURE 6.4 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN KALBARRI, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.4 Geraldton

Regional profile

Geraldton is a coastal city, located 424 km north of Perth. The city serves as a regional service area for the surrounding farming and fishing industries. The mining industry has also played an increasingly important role in Geraldton, and is now one of the largest value adding sectors in the City¹⁰. As a result of being a regional service area, the city is host to a wide array of support industries. The city also serves as the gateway to the popular Abrolhos Islands – a 122 island archipelago located 70km west of the city.

Geraldton has its roots outside of the Lobster fishing industry, with its initial visitation as early as 1839. The discovery of a form of lead ore in the vicinity, as well as a guano harvesting in nearby Shark Bay rendered the Geraldton's early roots as a military guard outpost¹. Shortly thereafter convicts arrived in 1857, and amongst them were fishers, fishmongers, shipwrights and sail makers. Five decades later, in the early 1900s the fishing industry was established¹, with immigrants from Scandinavia and Italy dominating the industry and exploring the Abrolhos islands.

It was as early as 1904 that the that the Abrolhos was seen as a potential commercial crayfish site, and strong demand from the United States post WWII, in conjunction with the development of canning of lobster caused the industry to flourish¹.

It was animosity among fishers based in Geraldton and Fremantle overfishing stock at the Abrolhos Islands that rendered the establishment of the first fishery zones in 1948, which required catch there to be brought ashore in Geraldton alive, and processing facilities were subsequently opened in Geraldton. In 1951, the fishers of Geraldton formed the Geraldton Fisherman's Cooperative¹.

Rapid expansion of both the fishery, other fishing industries, and the expansion of other industries in the Mid-West region were boosts to Geraldton's growth to City status¹.

Geraldton has experienced population growth of 73.3 per cent over ten years to 2016. Over the same period, the median age of the community has risen by three years from 35 to 38 years of age. The average household sizes have increased slightly since 2006, from 2.4 to 2.5.

The workforce in Geraldton is 1,625 FTE according to the 2011 census. The median weekly personal income has risen over the last ten years from \$408 per week to \$493 per week. Consistent with trends across WA, the average house prices have remained stable contracted over the five years to 2016 (at an average of \$316,000).

Relative to the town median income, those that identify in the census as Rock Lobster fishers have a median income of \$1,764 per week. This translates to 157 per cent higher than the median personal weekly income for the area, when adjusted for CPI.

Economic contribution

There are approximately 52 boats operating near Geraldton (based on the assumptions presented in Section 2.1) account for approximately 23 per cent of the total Western Australian Rock Lobster annual catch. There is value added in Geraldton as a result of processing operation and the fishery sector.

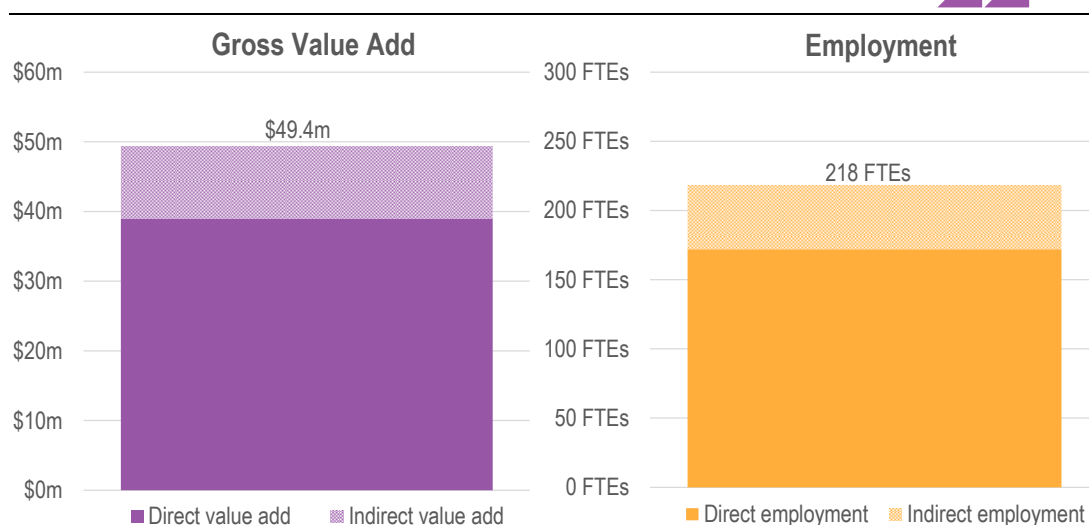
Figure 6.5 presents the economic contribution the Industry made to the Geraldton economy in 2016-17. The Industry accounted for \$39 million in direct economic impact in the area, which was derived mostly from the fishery sector itself and the processing sector. The direct output generated indirect economic output of \$10.4 million to Geraldton, implying an output multiplier of 1.27.

It is estimated that Geraldton's Gross Town Product was \$207 million in 2016-17, with ACIL Allen estimating that the Western Rock Lobster Industry accounted for approximately 24 per cent of the town's economy in 2016-17.

In employment terms the industry accounted for 172 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of 46 indirect FTE job, for a total of 218 FTE jobs in 2016-17, implying an employment multiplier of 1.27 in the area. It is estimated that the Industry accounted for 13 per cent of the jobs in the town in 2016-17.



FIGURE 6.5 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN GERALDTON, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.5 Dongara/Port Denison

Regional profile

Dongara and Port Denison are neighbouring towns situated near the mouth of the Irwin River. The towns are located four km apart, 351 km north of Perth. The towns are considered to be both a tourism location and a rock lobster fishing location. The towns of Port Denison and Dongara are home to a dangerous off-shore reefs, which in its early settlement hindered the town's growth. Originally the towns have a history as service towns until Geraldton transitioned into this space, at which point Dongara and Port Denison became a summer holiday camp with recreational fishing. In the late 1950's, a crayfishing business was established in town and shortly thereafter Dongara became a permanent base for the crayfishing community.

The population of Dongara and Port Denison has remained relatively stable, with a population of 2,926 people in 2006 as compared to 2,947 in 2016. In alignment with other Western Rock Lobster oriented communities, the median age in Dongara and Port Denison has been maturing, from a median age of 42 in 2006 to a median age of 50 in 2016. Average household sizes have been declining; in 2016 there were 2.2 people per household.

The median weekly personal income rose in the period 2006 to 2011, however has declined in the five years since. In 2016, the median weekly personal income was \$487 per week. Dongara and Port Denison have a combined workforce of 1,659 FTE. Consistent with trends across WA, the average house prices have contracted in the five years to 2016 (fallen by 12 per cent to \$300,000).

Relative to the town median income, those that identify themselves in the Census as Rock Lobster fishers have a median income of \$1,386 per week, which is 166 per cent higher than the median weekly personal income for the two towns.

Economic contribution

There are approximately 12 boats operating near Dongara and Port Denison which (based on the assumptions presented in Section 2.1) accounting for approximately five per cent of the total Western Australian Rock Lobster annual catch.

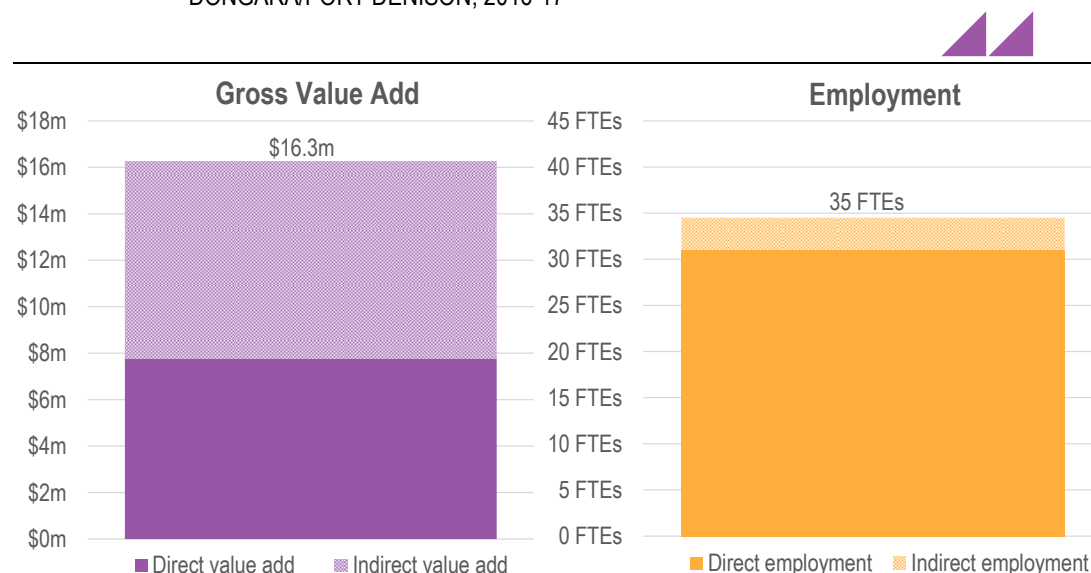
Figure 6.2 presents the economic contribution the Industry made to the combined Port Denison and Dongara economy in 2016-17. The Industry accounted for \$7.8 million in direct economic impact in the area, which was derived mostly from the fishery sector itself and the boat building sector. The direct output generated indirect economic output of \$8.5 million, implying an output multiplier of 2.1.



It is estimated that Port Denison and Dongara's Gross Town Product was \$116 million in 2016-17, with ACIL Allen estimating that the Western Rock Lobster Industry accounted for approximately 14 per cent of the town's economy in 2016-17.

In employment terms, the Industry accounted for 31 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of four indirect FTE jobs, for a total of 35 FTE jobs in 2016-17, implying an employment multiplier of 1.11 in the area. It is estimated that the Industry accounted for 2.1 per cent of the jobs in the town in 2016-17.

FIGURE 6.6 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN DONGARA/PORT DENISON, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.6 Leeman

Regional profile

Leeman is located on the coast 260km north of Perth. The population of Leeman has fallen over the last ten years, from 419 to 375 between 2006 and 2011, and further to 372 people in 2016. The population of Leeman has been ageing, and the median age in 2006 was 39 as compared to 52 in 2016; a rise of 13 years over a ten year period.

Leeman has its roots as a holiday destination for farmers in the region to escape the summer heat, post-harvest. Initially the town was a camp site, however as time progressed temporary shacks were built in the area¹. The intensification of construction in the area is attributed to the Western Rock Lobster Industry, and in 1957 fishers from Rockingham sought safe anchorage further up the coast¹. Permanent structures are thought to have been built as early as 1958, and the town was gazetted by another name – Snag Island – in 1962 prior to a name change to Leeman in 1971. Other industries, such as the mineral sands industry in the 1970s, developed the town further¹.

Leeman remains a popular tourist destination with domestic visitors, due to the large local sea lion population, the nearby freshwater lake that is suitable for a variety of water sports and caving in the nearby Stockyard Gully National Park that supports an underwater river system¹¹.

Leeman has a workforce of 241 FTE as at 2011. The median weekly personal incomes have, over a ten year period, been contracting. In 2006, real median weekly incomes were at \$458 per week, and have since fallen 13.3 per cent to \$404 per week in 2016.

Consistent with trends across WA, the average house prices have contracted over the five years to 2016 (fallen by 12 per cent to \$295,000).

Relative to the town median income, those that identify in the Census as Rock Lobster fishers have a median income of \$1,386 per week, which is 243 per cent higher than the median personal weekly



income for the area of \$404 per week. Direct employment, as indicated by the 2016 Australian Census, is 17 fishermen in the town.

Economic contribution

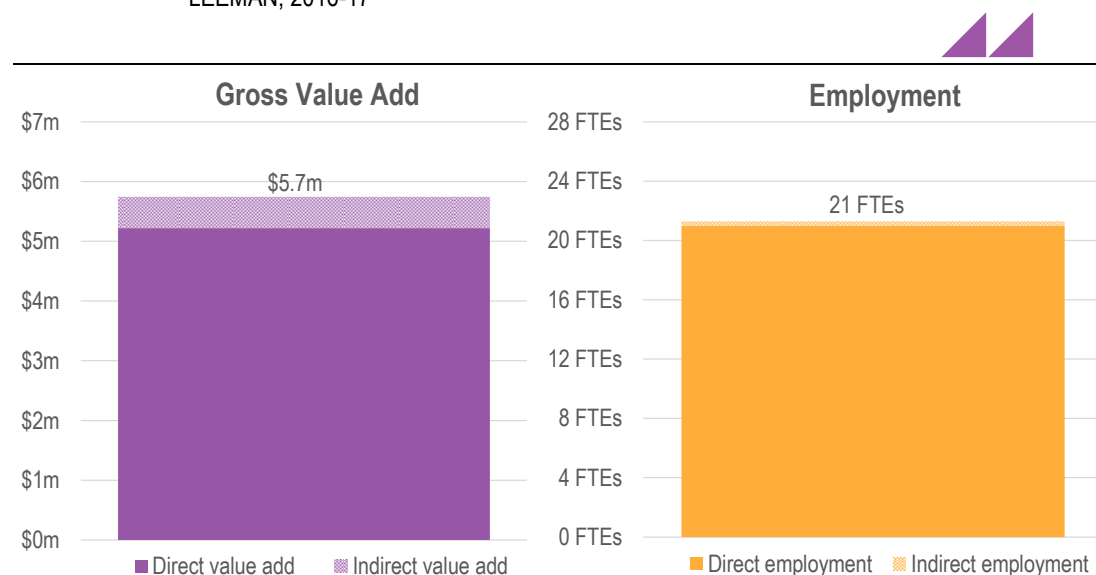
There are approximately eight boats operating near Leeman which (based on the assumptions presented in Section 2.1) account for approximately 3.5 per cent of the total Western Australian Rock Lobster annual catch.

Figure 6.7 presents the economic contribution the Industry made to the Leeman economy in 2016-17. The Industry accounted for \$5.2 million in direct economic impact in the area, which was derived mostly from the fishery sector itself. The direct output generated indirect economic output of \$523,716 to Leeman, implying an output multiplier of 1.1.

It is estimated that Leeman's Gross Town Product was \$25.2 million in 2016-17, with ACIL Allen estimating that the Western Rock Lobster Industry accounted for approximately 23 per cent of the town's economy in 2016-17.

In employment terms, the Industry accounted for 21 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of less than one indirect FTE jobs, for a total of 21 FTE jobs in 2016-17, implying an employment multiplier of 1.01 in the area. It is estimated that the Industry accounted for 8.7 per cent of the jobs in the town in 2016-17.

FIGURE 6.7 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN LEEMAN, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.7 Jurien Bay



Regional profile

Jurien Bay is located 220km north of Perth, along Indian Ocean Drive. To the east of Jurien Bay is Leseur National Park, and to the west is Jurien Bay Marine Park. The destination is a popular holiday location, and anecdotally the population of the town swells to nearly double during the holiday season.

Jurien Bay is so called because of the 9km long bay on which it sits, which is sheltered by a string of reef and small islands. The initial settlement of the town, in 1850, was as the result of land purchase and development by one family in the area¹. A jetty in 1885 allowed for direct export of wool produced in the area. Holiday houses were constructed, as were tents and makeshift shelters, to cater for the rising number of amateur fishers and holiday makers visiting the area in the 1940's and 1950's.

Rock Lobster as a commercial industry emerged in Jurien Bay in the 1950's as a result of a developing export market. The town site was gazetted in 1956, and fishing became an important part of the town's infrastructure¹.

The population of Jurien Bay has been steadily increasing over the last ten years, and this is a trend matched by the median age of the population. In 2006, the population was 1,420 and the median age 41. By 2016, the population had increased by 31 per cent to 1,860 people and the median age to 48. Average household size rose slightly to 2.4 in the five years to 2011, falling to 2.2 in the following five years to 2016. Consistent with trends across WA, the average house prices have contracted over the five years to 2016 (by 14 per cent to \$342,500).

The median weekly personal income was \$572 per week in 2011, relative to \$550 per week in 2016. Relative to the town median income, those that identify in the census as Rock Lobster fishers have a median income of \$1,512 per week, which is 174 per cent higher than the median personal weekly income for the area, when adjusted for CPI.

Economic contribution

There are approximately 21 boats operating near Jurien Bay which (based on the assumptions presented in Section 2.1) account for approximately nine per cent of the total Western Australian Rock Lobster annual catch.

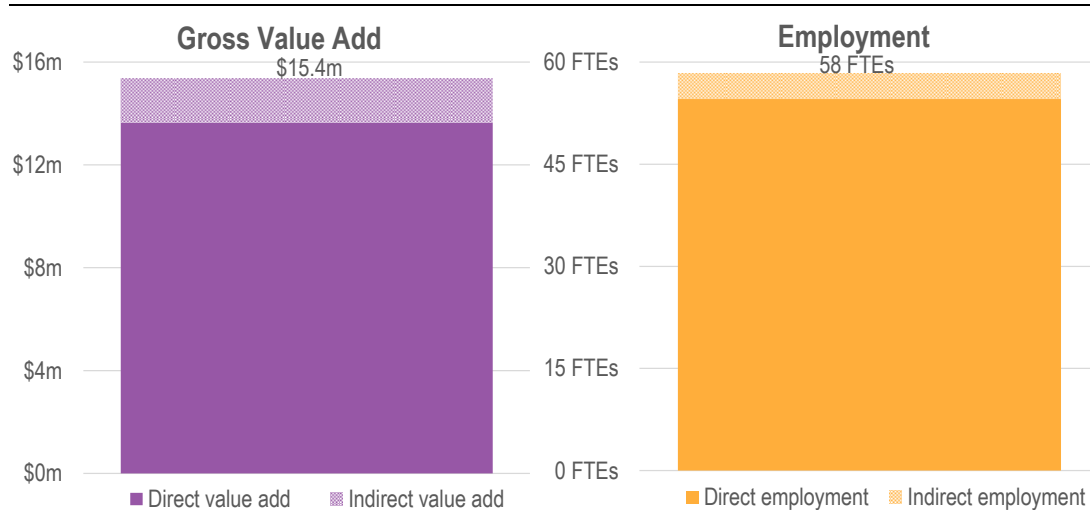
Both Jurien Bay and Cervantes lie within the LGA of Coorow. The economic modelling of Jurien Bay has been modelled in conjunction with Cervantes as a proportion of the entire LGA. The economic contribution of Jurien Bay is then apportioned according to the activity in the town on a sector level – in this instance mostly from the fishery industry itself – relative to Cervantes.

Figure 6.8 presents the economic contribution the Industry made to the Jurien Bay economy in 2016-17. The Industry accounted for \$13.6 million in direct economic impact in the area, which was derived mostly from the fishery sector itself. The direct output generated indirect economic output of \$1.7 million to Jurien Bay, implying an output multiplier of 1.13.

It is estimated that Jurien Bay's Gross Town Product was \$98.7 million in 2016-17, with ACIL Allen estimating that the Western Rock Lobster Industry accounted for approximately 15.6 per cent of the town's economy in 2016-17.

In employment terms the Industry accounted for 55 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of four indirect FTE jobs, for a total of 58 FTE^c jobs in 2016-17, implying an employment multiplier of 1.07 in the area. It is estimated that the Industry accounted for nine per cent of the jobs in the town in 2016-17.

^c Subject to rounding error

FIGURE 6.8 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN JURIE BAY, 2016-17

SOURCE: ACIL ALLEN CONSULTING

6.1.8 Cervantes

Regional profile

Cervantes is located 198 km north of Perth. The town is home to both lobster fishing and tourism, and benefits from close proximity to the Pinnacles and Nambung National park. Lake Thetis, a unique saline coastal lake, is also located in the vicinity.

Cervantes is relatively isolated, but owes its development to the Rock Lobster Industry in the late 1940s and 1950s, which resulted in the fishery's expansion to more remote waters¹. Shore based facilities developed slightly later than other towns in the region, with the first facilities developed in the 1960's – despite lack of road infrastructure and water supply. Three jetties were built in the town, all three due to processors, lobster traders and the Fremantle Fisherman's Co-op¹. Cervantes was gazetted as a town in 1963. The town is close to Nambung National Park, the Pinnacles and interest in tourism in the town emerged in the late 1970's¹.

The population of Cervantes has remained relatively stable over the past ten years, experiencing a slight decline between 2006 and 2011, and a slight increase to 557 in the 2011 to 2016 period. The median age over the ten year period also initially rose, from 47 to 51. In the latest Census, the median age of the population remained at 51. Average household sizes have similarly experienced a slight decline, reflecting the ageing population across the State. In the 2006 to 2011 period, the average household size declined from 2.3 to 2.1, and has remained stable over the five years to 2016. Consistent with trends across WA, average house prices have contracted over the five years to 2016 (fallen by 14 per cent to 342,500).

There are 199 FTE workers in Cervantes. The median weekly personal income in the area has also remained relatively stable over the last ten years, when adjusted for CPI. The median weekly personal income was \$442 per week in 2011, relative to \$531 per week in 2016. Relative to the town median income, those that identify in the Census as Rock Lobster fishers have a median income of \$1,386 per week, which is 213 per cent higher than the median personal weekly income for the area.

Economic contribution

There are approximately 19 boats operating near Cervantes which (based on the assumptions presented in Section 2.1) account for approximately four per cent of the total Western Australian Rock Lobster annual catch.



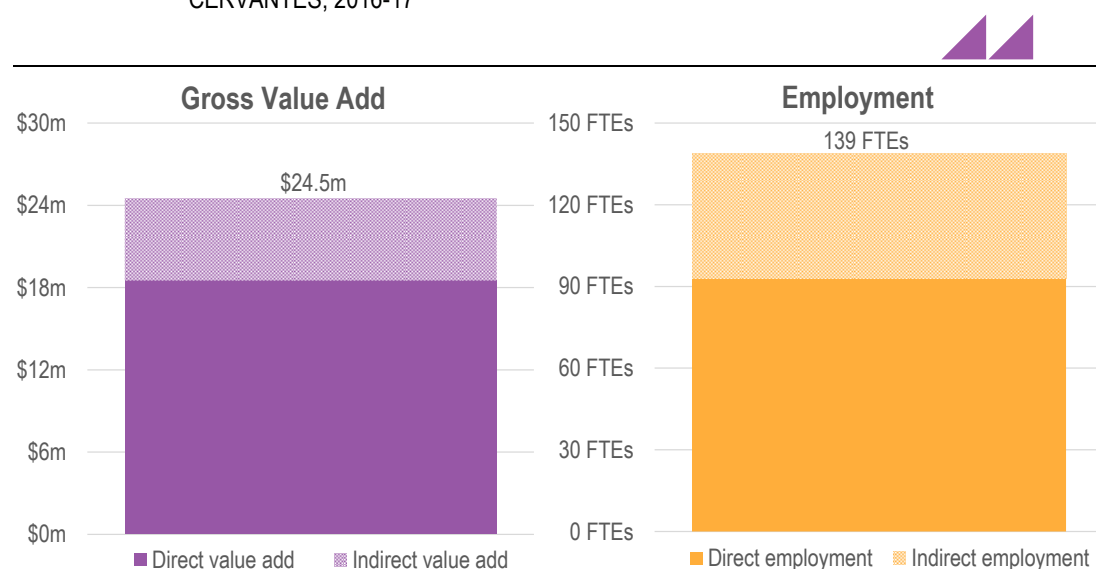
Both Jurien Bay and Cervantes lie within the LGA of Coorow. The economic modelling of Cervantes has been modelled in conjunction with Indonesia as a proportion of the entire LGA. The economic contribution of Cervantes is then apportioned according to the activity in the town on a sector level – in this instance mostly from the fishery industry itself, tourism and processed seafood manufacturing – relative to Indonesia.

Figure 6.9 presents the economic contribution the Industry made to the Cervantes economy in 2016-17. The Industry accounted for \$18.5 million in direct economic impact in the area, which was derived mostly from the fishery sector itself, and the surrounding tourism sector. The direct output generated indirect economic output of \$6 million to Cervantes, implying an output multiplier of 1.28.

It is estimated that Cervantes gross town product was \$32.5 million in 2016-17, with ACIL Allen estimating that the Western Rock Lobster Industry accounted for approximately 75 per cent of the town's economy in 2016-17.

In employment terms the Industry accounted for 93 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of 46 indirect FTE job, for a total of 139 FTE jobs in 2016-17, implying an employment multiplier of 1.49 in the area. It is estimated that the Industry accounted for 70 per cent of the jobs in the town in 2016-17.

FIGURE 6.9 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN CERVANTES, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.1.9 Lancelin

Regional profile

Lancelin is situated 127km north of Perth and within the shire of Gingin, a few kilometres from the start of the Indian Ocean Drive. In its 67 year history, Lancelin has been impacted by the consolidation of the Western Rock Lobster Industry. Today the town is a seasonal tourist community – with access to pristine dunes and water sports – as well as continuing to be a Western Rock Lobster fishing town.

Lancelin's early story is one of tourism, where the town was initially a holiday destination for nearby farming communities. Lancelin Island was used as a bombing range during World War II, for training purposes and at this time there were no permanent homes in the area¹. Professional crayfishing in the area in 1947 attracted permanent residents and surrounding services. In its early days, fishers found that it was more efficient to ferry product to Fremantle every few days, as opposed to across land¹.

Initially, fishers in Lancelin lived on their boats when they fished for rock lobsters, but as more trips to shore occurred so too did the development of onshore huts. The town was officially gazetted in 1950,



and as fishers wives and families arrived, the town developed into a thriving community¹. The leisurely lifestyle and proximity to the coast attracted a number of permanent residents in subsequent years.

The Lancelin community has been slowly growing over the last ten years, with a 2016 census population of 726 people, with the annual average rate of growth of 0.9 per cent. Lancelin has an ageing population – rising from a median age of 43 in 2006 to 50 in 2016 – and a slightly smaller average household size of 2.1 people per household (relative to 2.2 in 2006). House prices in Lancelin have remained stable over the five years to 2016, with an average house price of \$399,500.

Lancelin has a workforce of 288 FTE employees as at 2011. The median weekly personal income in the area has also remained relatively stable over the last ten years, when adjusted for CPI. The median weekly personal income was \$511 per week in 2011, relative to \$603 per week in 2016.

Relative to the town median income, those that identify in the census as Rock Lobster fishers have a median income of \$1,134 per week, which is 220 per cent higher than the median personal weekly income for the area.

Economic contribution

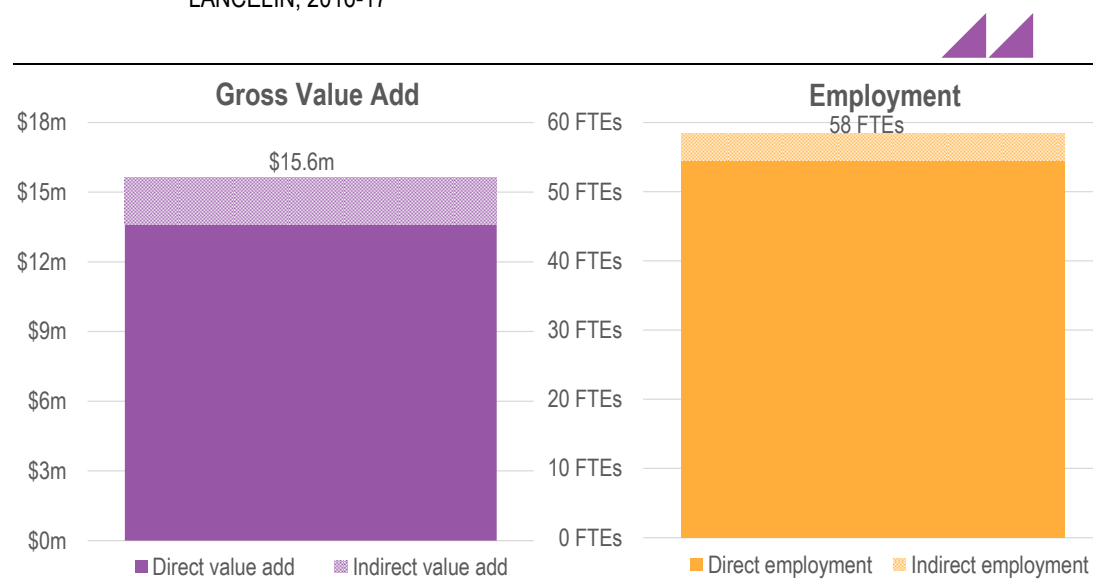
There are approximately 21 boats operating near Lancelin which (based on the assumptions presented in Section 2.1) account for approximately nine per cent of the total Western Australian Rock Lobster annual catch.

Figure 6.10 presents the economic contribution the Industry made to the Lancelin economy in 2016-17. The Industry accounted for \$13.6 million in direct economic impact in the area, which was derived mostly from the fishery sector itself, and the surrounding tourism sector. The direct output generated indirect economic output of \$2 million to Lancelin, implying an output multiplier of 1.15.

It is estimated that Lancelin's Gross Town Product was \$48.7 million in 2016-17, with ACIL Allen estimating that the Western Rock Lobster Industry accounted for approximately 32 per cent of the town's economy in 2016-17.

In employment terms the Industry accounted for 55 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of four indirect FTE jobs, for a total of 58 FTE^d jobs in 2016-17, implying an employment multiplier of 1.07 in the area. It is estimated that the Industry accounted for 20 per cent of the jobs in the town in 2016-17.

FIGURE 6.10 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN LANCELIN, 2016-17



SOURCE: ACIL ALLEN CONSULTING

^d Subject to rounding error.

6.2 Economic contribution of the Southern Zone

The Southern Zone delineates all towns further south than, and inclusive of, Two Rocks. The Southern Zone is further split into the South West and Perth regions for the purposes of this study, due to the difficulties in assigning a place of residence for fishers in the Perth Metropolitan region and South West zones, and therefore estimating the subsequent economic impact.

6.2.1 Headline results

ACIL Allen estimates the Industry accounted for \$176 million of direct economic output across the Southern Zone in 2016-17 (refer to Figure 6.11), which is the result of the value added activities generated in the Industry across the value chain from harvesting through to export to market. This level of activity in turn generated a further \$133 million in indirect economic output across the Southern Zone, primarily in the form of additional consumption spending from wage and salary earners in the Industry.

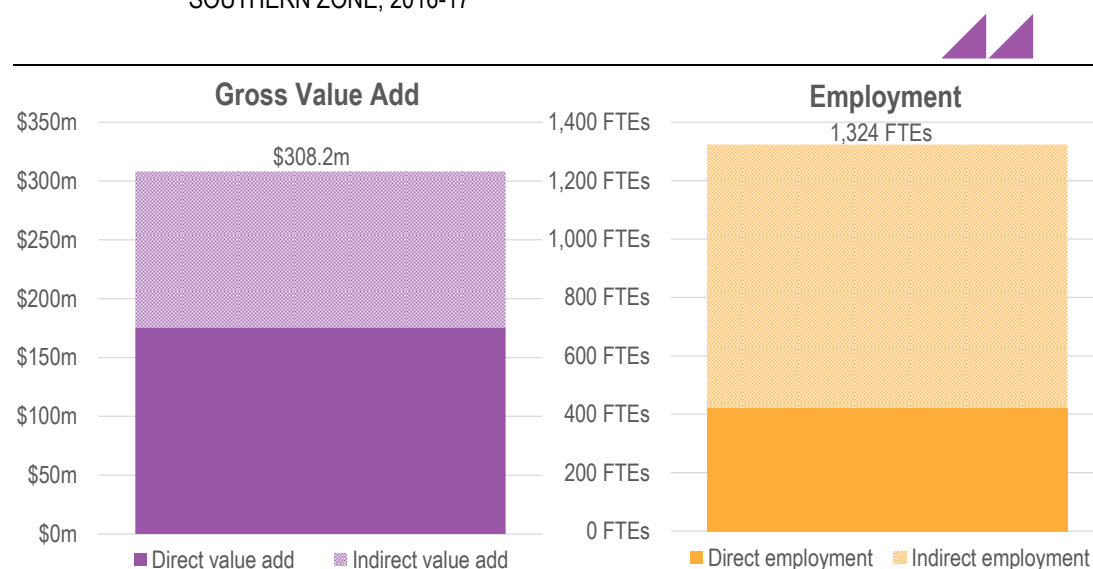
Overall, it is estimated that the Western Rock Lobster Industry generated \$308 million in direct and indirect economic output in the Southern Zone in 2016-17. The implied Industry multiplier is 1.76, which means that for every dollar spent by the Industry in the Southern Zone, additional spending of \$0.76 is generated across the Southern Zone economy.

In terms of employment, the Industry directly accounted for 421 FTE jobs in 2016-17. A further 903 indirect FTE jobs were generated throughout the Southern Zone's economy as a result of the activities across the Industry value chain.

Overall, the Industry accounted for 1,324 direct and indirect FTE jobs in 2016-17. The implied Industry employment multiplier is 3.14, meaning that for every direct FTE job generated by the Industry in the Southern Zone, a further 2.14 FTE jobs are generated throughout the Southern Zone's economy.

It is estimated that the Western Rock Lobster Industry generated \$306 million in economic output and 1,313 FTE jobs in the Southern Zone in 2016-17

FIGURE 6.11 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, SOUTHERN ZONE, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.2.2 Contribution by sector

The Fishery sector is the largest sector in Gross Value Added terms, accounting for 83 per cent (or \$145 million) of the total direct economic output generated in the Industry (refer to Figure 6.12). The Processed Seafood Manufacturing sector accounted for the majority of the remaining direct output generated by the Industry (17 per cent or \$29.8 million).

To generate this level of economic output, these sectors in turn require inputs from other sectors that are part of the Industry's overall supply chain, generating indirect value added activity in the Southern

Zone. An additional \$97.3 million in indirect economic impact was generated in the Fishery sector, \$21.7 million in Processed Seafood Manufacturing and \$13.7 million in Boat Building.

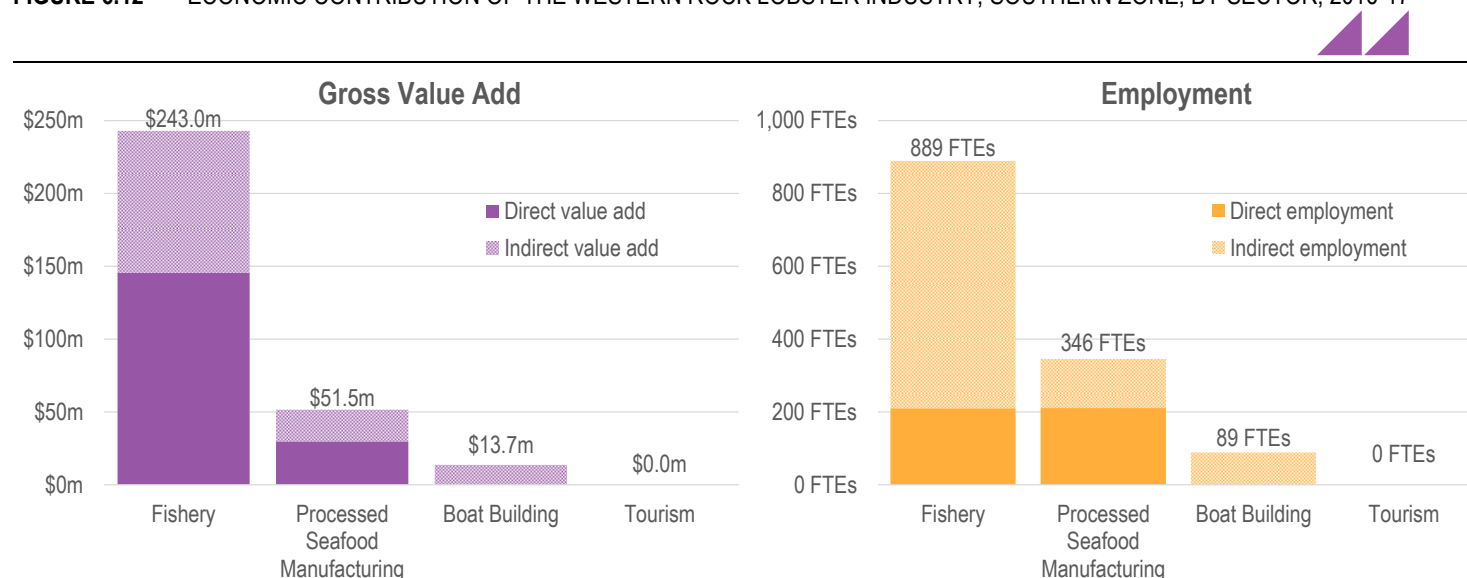
Across the Industry supply chain, the Fishery sector generated the largest direct and indirect economic impact (\$243 million), with significant contributions in Processed Seafood Manufacturing (\$52 million) and Boat Building (\$13.7 million) in 2016-17.

In terms of employment, the Fishery sector was the largest direct employing sector in the Industry, with 211 FTE jobs directly employed in the sector, and a further 679 FTE jobs indirectly employed in the Fishery sector. In total, there were 809 direct and indirect FTE jobs created throughout the Southern Zone in the Fishery sector in 2016-17.

The Processed Seafood Manufacturing sector is the second largest direct employer across the Industry supply chain, directly employing 211 FTE jobs, with a further 135 FTE jobs indirectly created as a result of the activities generated in the Industry. In total, there were 346 FTE jobs created across the Southern Zone in the Processed Seafood Manufacturing sector as a result of the Western Rock Lobster Industry.

The Industry also generated scores of jobs in Boat Building sector (89 FTE jobs) in 2016-17.

FIGURE 6.12 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY, SOUTHERN ZONE, BY SECTOR, 2016-17



SOURCE: ACIL ALLEN CONSULTING

6.2.3 Perth

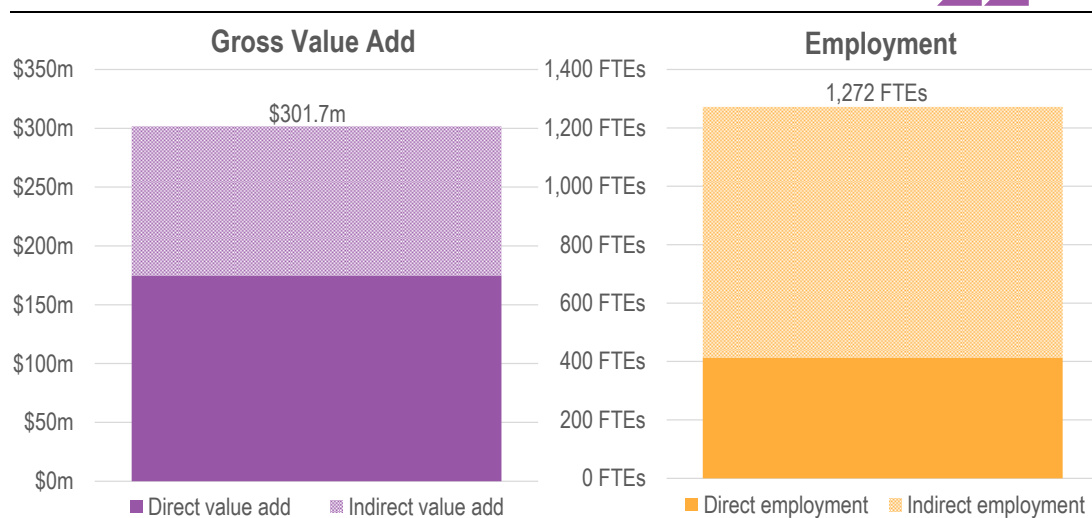
Economic contribution

There are approximately 78 boats operating near the Perth region, which in this instance is inclusive of Two Rocks to Mandurah (based on the assumptions presented in Section 2.1). These boats account for approximately 36 per cent of the total Western Australian Rock Lobster annual catch. There is value added in Perth as a result of the direct fishery sector, processing and boat building.

Figure 6.4 presents the economic contribution the Industry made to the Perth economy in 2016-17. The Industry accounted for \$175 million in direct economic impact in the area, which was derived mostly from the fishery sector itself with processed seafood manufacturing and boat building contributing to the overall impact as well. The direct output generated indirect economic output of \$127 million to Perth, implying an output multiplier of 1.73.

In employment terms the Industry accounted for 414 direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of 858 indirect FTE job, for a total of 1,272 FTE jobs in 2016-17, implying an employment multiplier of 3.07 in the area.



FIGURE 6.13 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN PERTH, 2016-17

SOURCE: ACIL ALLEN CONSULTING

6.2.4 South West

Economic contribution

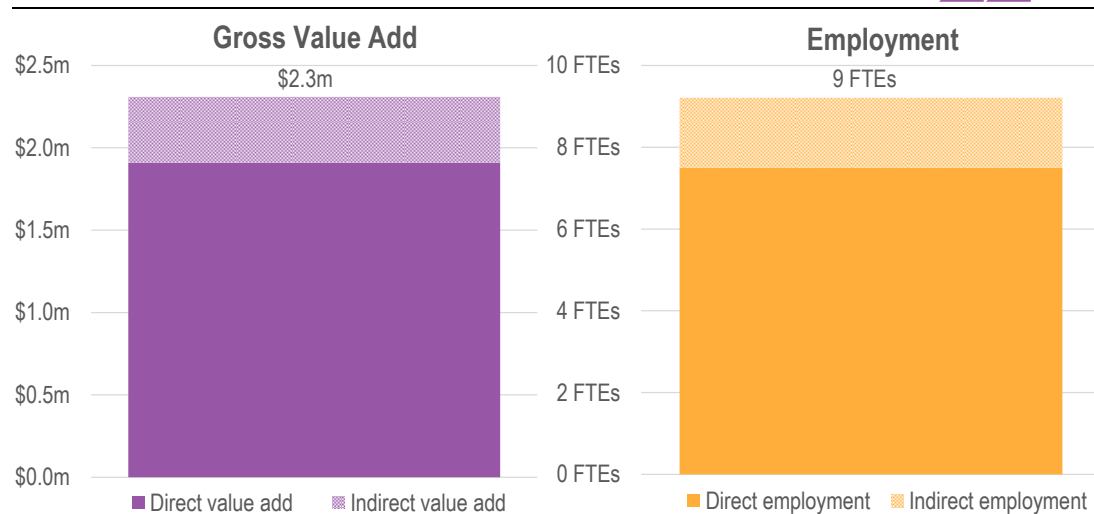
There are approximately three boats operating near the South West, which is inclusive of Busselton and Bunbury in this instance (based on the assumptions presented in Section 2.1). These account for approximately one per cent of the total Western Australian Rock Lobster annual catch. There is value added in the South West as a result of the direct fishery sector.

Figure 6.14 presents the economic contribution the Industry made to the South West economy in 2016-17. The Industry accounted for \$1.9 million in direct economic impact in the area, which was derived mostly from the fishery sector itself. The direct output generated indirect economic output of \$400,451 to the South West, implying an output multiplier of 1.21.

In employment terms the Industry accounted for eight direct FTE jobs in 2016-17. All activities across the Industry's value chain in area accounted for the creation of two indirect FTE job, for a total of nine FTE^e jobs in 2016-17, implying an employment multiplier of 1.23 in the area.

^e Subject to rounding error.

FIGURE 6.14 ECONOMIC CONTRIBUTION OF THE WESTERN ROCK LOBSTER INDUSTRY IN SOUTH WEST, 2016-17



SOURCE: ACIL ALLEN CONSULTING



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The table below provides the list of Industry representatives consulted as part of this study.

TABLE 7.1 STAKEHOLDER CONSULTATION

Name	Organization	Sector
Linda Williams	Western Rock Lobster Council	Fisher
David Thompson	Indian Ocean Rock Lobster	Processor
John Fitzhardinge	Southerly Designs / Dongara Marine	Boat Building
Terry Lissiman	Fisher / WRLC	Fisher
Ross Brown	Commonwealth Bank – Regional and Agribusiness banking	Finance
Gavin Treasure	Mid-West Development Commission	Government
Peter Stanich	Fisher	Fisher
Ryan Fuller	Kailis Bros	Processor
Greg Hart	Wild Oceans	Export
Alex Fotiou	Bluwave Processing	Processor
Joe Scaffidi	Fisher	Fisher
Andrew Roseby	ANZ – Regional Business Banking	Finance
Wayne Hosking	Geraldton Fishermen's Co-operative Ltd	Fisher/ Processor
Alison Slys	Shire of Dandaragan	Local Government

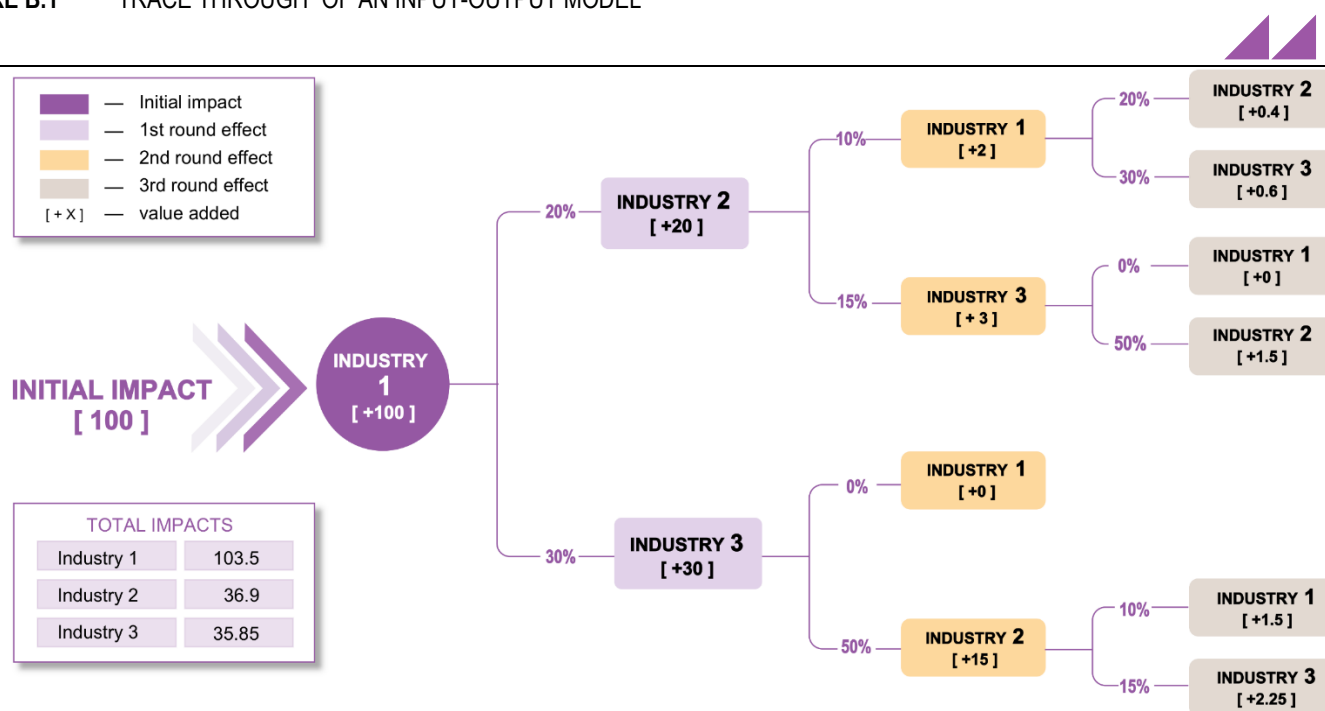
SOURCE: ACIL ALLEN

B

INPUT-OUTPUT MODELLING FRAMEWORK

I-O models capture the direct and indirect effects of expenditure by capturing, for each industry, the industries it purchases inputs from and also the industries it sells its outputs to. For example, the I-O model for Western Australia captures purchases from and sales to industries located in Western Australia, as well as imports from outside of Western Australia. **Figure B.1** depicts how an impact is traced through a (very simple) economy with three industries (1, 2, and 3), and is described below.

FIGURE B.1 “TRACE THROUGH” OF AN INPUT-OUTPUT MODEL



SOURCE ACIL ALLEN CONSULTING:

1. The initial impact occurs in Industry 1 where an additional 100 units of value are added to its output. In order to generate this additional output, Industry 1 requires additional inputs from Industry 2 and Industry 3.
2. Therefore, Industry 2 and 3 increase their output as well. This in turn requires input from Industry 1 and 3 and Industry 1 and 2 respectively which increase their output to satisfy this additional demand, and so on.
3. The impacts grow smaller with each iteration and ultimately converge to zero. This is because they always only share the impact that occurred in the preceding iteration.

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