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Economic and Social Indicators for Queensland's Aquaculture, 2021/22

A report for Department of Agriculture and Fisheries

14 June 2024

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Glossary

Farmgate price: refers to the price received by aquaculture businesses when selling their produce from farm. This can include some processing which occurs on farm and is an integrated part of many aquaculture businesses. It is generally expressed in terms of $/kg or $/unit.

Business profit: is defined as GOS less depreciation less owner-operator and unpaid family labour. Business profit represents a more complete picture of the actual financial status of an individual firm, compared with GOS, which represents the cash in-cash out situation only.

Cash income: is defined as GOS less imputed wages for owner-operator and unpaid family labour.

Depreciation: refers to the annual reduction in the value of capital due to general wear and tear or the reduction in value of an item over time. Note this is a measure of economic depreciation not accounting depreciation.

Employment: is a measure of the number of working proprietors, managers, directors, and other employees, in terms of the number (total jobs) or full-time equivalent (fte) jobs. One fte is considered to be 37.5 hours for 42 weeks per year.

Equity: aquaculture businesses in Queensland utilise land, broodstock, valuable buildings, machinery, equipment, vessels or vehicles and other capital. They may hold cash and may also hold debt to finance the business and other liabilities. The total assets held by a business less its total liabilities is the business' equity, which can be expressed in dollar terms or as a percentage of total asset value.

Farm capital: includes capital items that are required by the aquaculture business to earn income. It includes land, broodstock, boats, motor vehicles, sheds, cold rooms, and processing infrastructure which are included to the extent that they are used in the aquaculture business.

Gross income: refers to the cash receipts received by an individual firm and is expressed in dollar terms. Gross Income is calculated as total production (kg) multiplied by 'farmgate price' ($/kg). Total income is the contribution of an individual aquaculture business to the GVP of an aquaculture sector.

Gross margin: is defined as total income less total variable costs. This is a basic measure of profit which assumes that capital has no alternative use and that as farming activity varies there is no change in capital or fixed costs.

Gross operating surplus (GOS): is defined as total income less total cash costs and is expressed in current dollar terms. GOS may be used interchangeably with the term gross profit. A GOS value of zero represents a breakeven position for the business, where total cash costs (TCC) equals total cash receipts (TCR). If GOS is a negative value, the firm is operating at a cash loss and if positive the firm is making a cash profit. GOS does not include a value for owner/operator wages, unpaid family work, or depreciation.

Gross regional product (GRP) and gross state product (GSP): is a measure of the net contribution of an activity to the state/regional economy. Contribution to GSP or GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. It can also be measured as household income plus other value added (gross operating surplus and all taxes, less subsidies). It represents payments to the primary inputs of production (labour, capital, and land).

Gross value of production (GVP): refers to the value of the total annual sales for, individual aquaculture businesses, aquaculture species or the aquaculture industry as a whole, and is measured in dollar terms.

Household income (economic contribution): is a component of gross state product (GSP) and gross regional product (GRP) and is a measure of wages and salaries, drawings by owner operators and other payments to labour including overtime payments and income tax but excluding payroll tax.

Owner-operator and unpaid family labour: in many businesses there is a component of labour that does not draw a direct wage or salary from the business. This will generally include owner/operator labour and often also include some unpaid family labour. The value of this labour needs to be accounted for which involves imputing a labour cost based on the amount of time and equivalent wage rate. In the above calculations this labour cost can be included simply as another cost so that GOS takes account of this cost. Alternatively, it can be deducted from GOS to give a separate indicator called cash income. Owner-operator and unpaid family labour is separated into variable labour (farming and repairs and maintenance) and overhead labour (management and administration). The minimum wage rate for 2021/22 was used to value the time spent on farming, and repairs and maintenance and double the minimum wage rate for 2021/22 was used to value the time spent on management and administration. This is consistent with the commercial and charter fishing reports.

Profit at full equity: is calculated as business profit plus rent, interest, and lease payments less depreciation associated with leased capital. Profit at full equity represents the profitability of an individual aquaculture business, assuming the business has full equity in the operation, i.e. there is no outstanding debt associated with the investment in capital. Profit at full equity is a useful absolute measure of the economic performance of aquaculture businesses.

Rate of return to farm capital: is calculated as profit at full equity divided by farm capital multiplied by 100. In this calculation, the value of leased equipment is capitalised and added to total capital to represent a 'full equity' scenario. This measure is expressed in percentage terms and is calculated for an individual aquaculture business. It refers to the economic return to the total investment in capital items and is a useful relative measure of the performance of individual firms. Rate of return to total capital is useful to compare the performance of various aquaculture businesses, and to compare the performance of other types of operators, and with other industries.

Sample size: unless otherwise specified, is the survey sample size from the 2021/22 base year.

Total cash costs (TCC): defined as total variable costs plus total fixed costs.

Total fixed costs: are costs that remain fixed regardless of the level of farming production. As such these costs, measured in current dollar terms, are likely to remain relatively constant from one year to the next. Examples of fixed cost include:

- insurance
- administrative and industry fees
- office and business administration (communication, stationery, accountancy fees)
- interest on loan repayments and overdraft
- leasing.

Total variable costs: are costs which are dependent upon the level of farming production. As production increases, variable costs also increase. Variable costs are measured in current dollar terms and include the following individual cost items:

- fuel, oil and grease
- farming and processing equipment
- packaging
- feed
- provisions
- wages
- unscheduled repairs and maintenance.

Abbreviations

ABS	Australian Bureau of Statistics
CPI	Consumer Price Index
DAF	Department of Agriculture and Fisheries
fte	full time equivalent
GOS	gross operating surplus
GRP	gross regional product
GSP	gross state product
GVP	gross value of production
MIW	Mackay – Isaac – Whitsunday
QLD	Queensland
R&M	repairs and maintenance
RBA	Reserve Bank of Australia
SEQ	South East Queensland
SFS	Queensland Sustainable Fisheries Strategy 2017-2027
TCC	Total cash costs

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Executive summary

This report presents the first set of economic and social indicators for the aquaculture industry in Queensland and covers the three financial years 2019/20 to 2021/22. These indicators are intended to be comparable to the indicators for Queensland's commercial fisheries. They are reported by aquaculture species category (sector) and by reportable (non-confidential) regions. The indicators are based on Department of Agriculture and Fisheries (DAF) data, a 2021/22 financial year business survey, and industry wide available data.

Overview of approach

Compared to fisheries, aquaculture businesses are less likely to operate across multiple species due to the many differences in business operations and expertise between the different aquaculture species. Also unlike fishing businesses, aquaculture businesses are more likely to be vertically integrated across the operation of the farm, hatchery and processing of the product.

Four species categories (or sectors) have been used in this analysis: prawns, barramundi, freshwater fish and other species. 'Other species' consists of the four subcategories: redclaw, edible oysters, aquarium/hatchery and others, which have been merged due to limited survey responses in each category. The businesses within these categories have been modelled and then aggregated to form a 'sector wide' financial model. This model includes the business operations across aquaculture farming, processing and packaging, and business administration.

The following steps were followed to produce the financial and economic indicators:

1. Collect aquaculture monitoring and administrative data
2. Survey aquaculture farming businesses (2021/22 financial year)
3. Model surveyed businesses
4. Scale business models to sector wide models
5. Back cast sector wide business models to 2019/20 and 2020/21
6. Model regional business models based on sector wide models
7. Calculate indicators for each species and region.

The business survey received 42 total responses. The percentage of total gross value of production (GVP) captured by the survey was 63 per cent for prawns, 54 per cent for barramundi and 88 per cent for freshwater fish. The percentage of total GVP captured by the survey for the other species category was much lower at 20 per cent. This, combined with the variety of species and business types within the 'other species' category means that the indicators for it should be used with caution.

Social indicators and demographics were analysed and reported as a simple average of all responses.

Economic Indicators

Table ES-1 presents the key financial and economic indicators for the total of Queensland's aquaculture. The growth of the overall sector between 2019/20 and 2021/22 is considerable as aquaculture production scaled up and became increasingly efficient and profitable.

Table ES-1 Summary of indicators for Queensland's aquaculture, 2019/20 to 2021/22

Indicator	2019/20	2020/21	2021/22
Production (t)	9,536	11,825	13,023
Gross value of production ($m)	164.9	193.5	224.7
Rate of return on farm capital at full equity ($m)	5%	7%	9%
Gross state product (direct + flow-on) ($m)	172.2	196.9	228.1
Employment (direct + flow-on) (fte)	1,404	1,554	1,759

Figure ES-1 show the economic contributions of aquaculture by species to Queensland. It shows that prawns and barramundi, the most significant aquaculture sectors in Queensland, have increased their production, profitability and contribution to the State's economy over the period 2019/20 to 2021/22. Meanwhile, freshwater fish and other species are more stable or showing signs of decline in terms of their economic contributions.

Social indicators

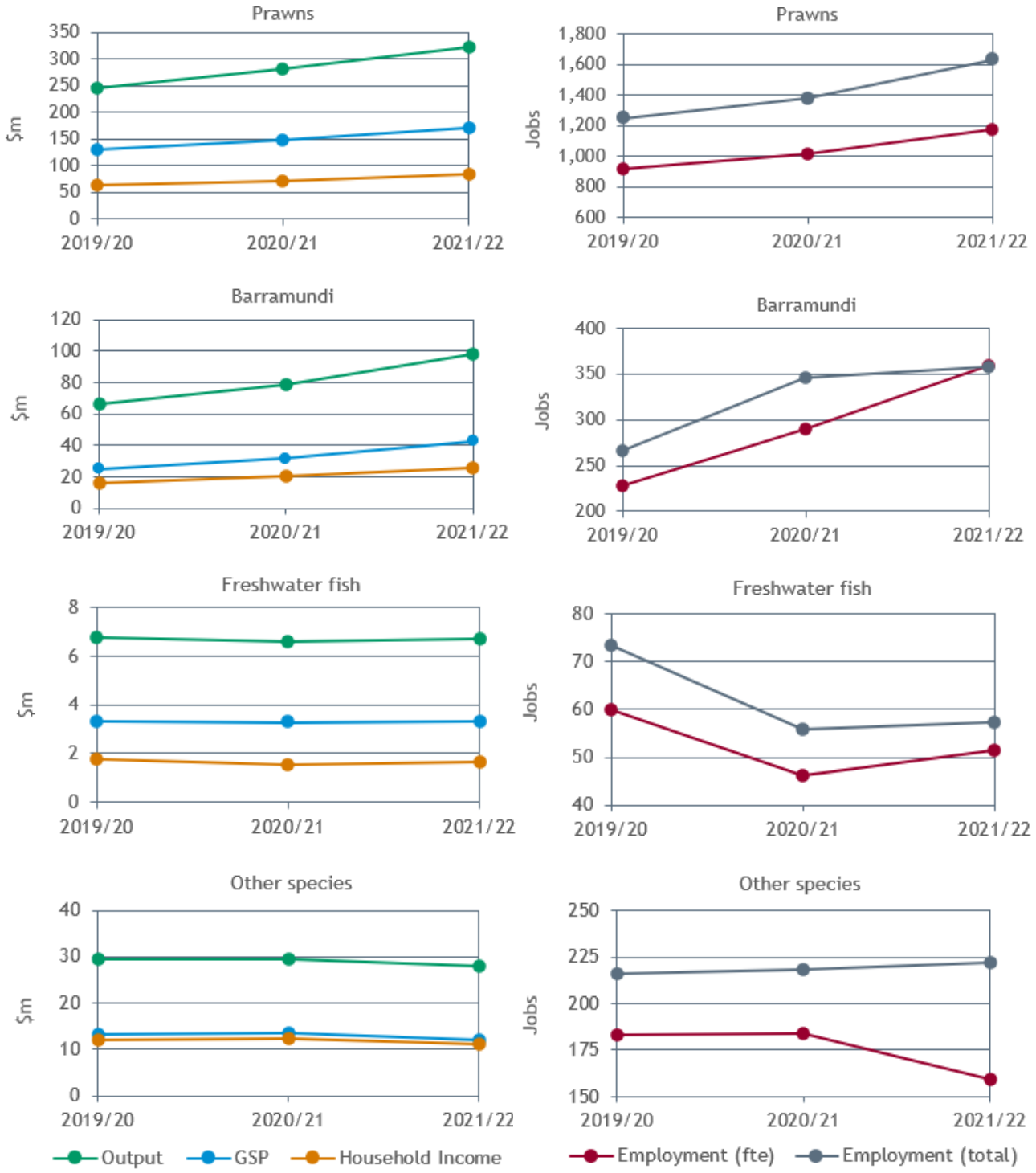
The results of the survey indicate that aquaculture operators generally have a good understanding of the management of aquaculture, but with varying degrees of satisfaction in the various government agencies which affect their business. They indicate that aquaculture operators are generally satisfied with the lifestyle associated with aquaculture, but less satisfied with the amount and reliability of income. Overall, the survey indicates that most aquaculture operators are intending to stay in the industry for a long time, likely partly due to the lifestyle benefits of the industry.

Future opportunities

These surveys of aquaculture businesses are enabling the development of economic and social indicators which can lead to a valuable annual timeseries which measures the economic activity of Queensland's aquaculture. As this timeseries grows, the indicators will improve the ability of management and industry to understand the economic and social values of aquaculture and better respond to changing situations.

Regular economic reporting across a range of industries is current practice in other states and territories around Australia. For example, annual economic indicators have been reported for commercial fisheries in South Australia for more than 20 years (BDO EconSearch 2023b) and a similar monitoring program began in New South Wales in 2021 (BDO EconSearch 2023c). This provides an important time series of economic information that all seafood stakeholders can draw upon. Economic information is also published regularly for other agriculture sectors such as the Dairy Farm Monitor Project (Dairy Australia 2023).

Figure ES-1 Economic contribution indicators by species, 2019/20 to 2021/22



1. Introduction

The Queensland Sustainable Fisheries Strategy 2017-2027 (SFS) sets out a comprehensive reform plan for the future. Within the SFS there are several actions which will improve the management of Queensland fisheries. With respect to actions relating to fisheries monitoring, the SFS requires Fisheries Queensland to deliver a practical and cost-effective system to collect data on economic indicators from Queensland's professional fishers (i.e. commercial fishers and charter operators) and directly related stakeholders (e.g. fish processors, wholesalers, community groups). As part of this plan, the Department of Agriculture and Fisheries (DAF) have extended the monitoring and reporting from fisheries to include aquaculture in Queensland. The monitoring and reporting for aquaculture are intended to be comparable, where possible, to fisheries reporting to enable comparison of the performance of the two sectors.

BDO established a method for creating a consistent time series of economic and social information for Fisheries Queensland. This involved creating a time series of economic and social indicators based on business surveys and regional economic information. The first set of indicators BDO created for Fisheries Queensland was based on a 2020 survey and back cast to 2017/18 and 2018/19. These economic and social indicators are used by Fisheries Queensland to better understand the economic and social aspects of the industry. They are also helpful to inform management decisions and monitor business targets. As the reporting of these indicators continue, they will provide an increasingly useful timeseries to help understand the economic development of the industry.

The fisheries timeseries and indicators are being extended based on a 2021/22 fisheries survey, which are being released alongside these aquaculture timeseries and indicators, also based on a 2021/22 survey of aquaculture businesses.

Queensland's aquaculture industry consists of a wide range of types of businesses, operating over many different seafood species. In 2021/22, the year of the survey which the indicators in this report are based on, the total aquaculture seafood production was valued at $224.7 million. This was comprised largely of prawn production ($167.1 million), including prawn hatcheries, and barramundi production ($46.3 million). Other notable species produced in Queensland include a variety of freshwater fish, redclaw, aquarium and hatchery, edible oysters and an array of other species such as sea cucumbers and algae.

Given the diverse nature of Queensland aquaculture, management decision making involves a complex mix of biological, economic and social considerations. There is a need to identify and explore cost-effective and efficient ways to incorporate economic and social information into decision-making processes.

Regular economic reporting across a range of industries is current practice in other states and territories around Australia. For example, annual economic indicators have been reported for commercial fisheries in South Australia for more than 20 years (BDO EconSearch 2023b) and a similar monitoring program began in New South Wales in 2021 (BDO EconSearch 2023c). This provides an important time series of economic information that all seafood stakeholders can draw upon. Economic information is also published regularly for other agriculture sectors such as the Dairy Farm Monitor Project (Dairy Australia 2023).

1.1. Aquaculture species overview

The analysis in this report uses categories of aquaculture species production from the DAF Aquaculture Production Summary report (DAF 2022) to analyse economic indicators by species. Prawns, barramundi and freshwater fish have the same definitions as the DAF report, while the 'other species' category as analysed in this report has been broadened from the Department's definition to include, redclaw, edible oysters,

aquarium/hatchery and other species. This section provides detail about each species category and information on the activities involved in the farming and processing of each species.

Prawns

Queensland's prawn aquaculture sector produced the following two prawn species in 2021/22:

- Black tiger prawns (*Penaeus monodon*)
- Banana prawns (*Penaeus merguiensis*).

The majority of prawn production comes from large businesses which generally have some degree of vertical integration with the farming, hatchery and processing operations. The prawns are grown out in pond systems which are constructed on coastal lands or near estuarine parts of river systems.

Hatchery sales in the QLD prawn sector make up a small proportion of the total GVP of the sector (0.3 per cent). Prawn production in 2021/22 was largely concentrated in Mackay, with 62 per cent of total production. This has increased considerably since 2019/20 when Mackay produced 37 per cent of total prawn production. There were 17 active[1] prawn farms in Queensland in 2021/22.

Barramundi

This sector only includes the farming of barramundi (*Lates calcarifer*) which can be produced in both freshwater and seawater. Most barramundi production is from freshwater pond based farm systems, however some production utilises sea cages or recirculating systems.

The majority of barramundi production in 2021/22 (59 per cent) was in Cairns. Cairns is well suited to barramundi production due to its warm climate, alongside the ideal water temperature of 25 to 30 degrees for barramundi health and growth. There were 17 active barramundi farms in Queensland in 2021/22.

Freshwater fish

The freshwater fish farming sector involves the farming of a broad range of fish species. However, it is dominated by the following three species:

- Silver perch (*Bidyanus bidyanus*)
- Jade perch (*Scortum barcoo*)
- Murray cod (*Maccullochella peelii*).

Freshwater fish aquaculture production takes place in tank or pond based systems. Water temperature, PH levels and oxygen levels are all important for freshwater fish species health and growth, and as such the monitoring systems in the tanks or ponds are important to the farms production.

Freshwater fish production in 2021/22 was largely concentrated in Wide Bay, which held 58 per cent of total production for the State. The remainder of freshwater fish production is in regions which data are confidential and are not separately published in this report. There were 14 active freshwater fish farms in Queensland in 2021/22.

[1] That is, produced product for sale in the 2021/22 financial year.

Other species

Due to limited survey responses this species category it includes the 'rest of aquaculture' species category as defined in DAF (2022), as well as redclaw, edible oysters and aquarium/hatchery production. When 'other species' is referred to in this report, it is referring to the other species category as defined in this section.

Table 1-1 shows the gross value of production (GVP) of each species within other species for 2021/22.

Table 1-1 Gross value of production by species within 'other species', 2021/22

	Redclaw	Oysters	Aquarium/ hatchery	Rest of Aquaculture	Total
Gross value of production ($m)	0.9	0.4	5.2	1.4	7.9
Percentage of total GVP	11%	5%	66%	18%	100%

Source: BDO analysis, DAF (2022)

The hatchery and aquarium sector, the largest within this category, involves growers who produce ornamental aquarium species and fingerlings for commercial grow-out or stocking in public impoundments. The majority of the GVP of this sector comes from the selling to commercial aquaculture.

Redclaw production is mostly done in earthen ponds, and the businesses are generally small to medium in size, with many owner-operated businesses in the sector.

Edible oyster production is conducted in either estuarine or offshore areas. The oyster businesses are generally small to medium in size.

The 'rest of aquaculture' sub-category consists of a multitude of species, business types and markets. The species grown in this category include marine fish, algae, crustaceans and other bivalves.

1.2. Regional reporting

Economic contribution results are presented for Queensland as a whole and on a regional basis. The regions are based on individual or amalgamations of SA4 regions as defined by the Australian Bureau of Statistics (ABS). The following regions of Queensland have been reported.

- South East Queensland (SEQ) – comprised of:
  - Sunshine Coast
  - Brisbane – East
  - Brisbane – North
  - Brisbane – South
  - Brisbane Inner City
  - Gold Coast
  - Logan – Beaudesert
  - Moreton Bay – North
  - Moreton Bay – South.
- Cairns
- Mackay – Isaac – Whitsunday (MIW)
- Townsville
- Wide Bay.

1.3. Report structure

Provided in Section 2 of this report are the method of analysis and a description of the survey of aquaculture businesses. Economic indicators are presented in Section 3 for the financial years 2019/20, 2020/21 and 2021/22 and include:

- Business financial indicators
- Economic contribution indicators.

Demographic indicators for the 2021/22 financial year are presented in Section 4. Social indicators for the 2021/22 financial year are presented in Section 5, including:

- Perceptions of management
- Lifestyle and satisfaction
- Community contribution and perception.

2. Method of analysis

2.1. Indicator analysis

Aquaculture businesses are less likely to operate across multiple species compared to fishing businesses due to the large differences in business operations between different aquaculture species. Furthermore, unlike fishing businesses, aquaculture businesses in Queensland are more likely to be vertically integrated across the growing and farming of aquaculture, to the processing and packaging, and hatchery operations. For this analysis, individual businesses within each of the four sectors (prawns, barramundi, freshwater fish and other species) have been modelled and then aggregated to form a 'sector wide' financial model. This financial model includes the business operations across aquaculture farming, processing and packaging, and business administration, where these activities occur on farm.

Stage 1: Collect aquaculture monitoring and administrative data

Data were requested from DAF monitoring and administrative systems to build a business level understanding of aquaculture farming activity in Queensland. This included data on the following from the years 2019/20, 2020/21 and 2021/22:

- Business contact information
- Business level production data in terms of tonnes produced by species type
- Business level gross value of production, in terms of dollars received for produce sold.

Stage 2: Survey aquaculture farming businesses

A survey of aquaculture businesses was undertaken (see Section 2.2) to collect various data items that are not held by DAF but are required to calculate economic and social indicators. Some data collected in the survey (e.g. production and revenue by species type) are held by DAF but are useful for checking the accuracy of the survey results. Survey data included:

- Production by species type
- Revenue by species type
- Capital value and depreciation of buildings, equipment and other physical capital
- Operating costs, including farming, processing and packaging, and business administration costs
- Employment (including unpaid)
- Demographic information
- Perceptions of management, lifestyle and other social matters.

Data were collected respecting the confidentiality of businesses and were used by BDO to produce the economic and social indicators reported. The data were not distributed outside of BDO and may not be provided to DAF without prior permission from the businesses in question.

Stage 3: Model surveyed businesses

Fishery monitoring and administrative data and business survey data were combined to model the structure and activity of each individual aquaculture farming business that participated in the survey. The model describes each business in terms of all data items identified above in stages 1 and 2, such that they can be combined to understand the cost and revenue structure of the businesses.

The set of business models was validated through a series of plausibility checks to ensure that each survey response was matched to the correct records in the monitoring and administrative data and that each survey response itself was internally coherent. For example, revenue by species from the survey was compared to

revenue by species in the monitoring and administration data to ensure there were no considerable outliers in reported revenues.

Stage 4: Scaling to a sector wide model

A sector wide model, for each of the four sector types (prawns, barramundi, freshwater fish and other species) was created from a combination of the modelled individual businesses and aquaculture monitoring and administrative data.

The first step in generating a sector wide business model was to separate the business data/models into sector types. Once the business models were categorised, they were scaled by using the difference in GVP between what was captured in the survey and the total GVP of that species. This assumes that the average of the businesses surveyed are representative of the average of businesses which were not surveyed. The reliability of this assumption relies on the sample size of the survey, and as discussed in Section 2.2 the sample size for each species type, other than 'other species', is high enough for this assumption to be reasonable.

For 'other species', this incorporated four different aquaculture categories: aquarium/hatchery, edible oysters, redclaw and rest of aquaculture. Because of the high variability in business structures between these categories, each category with survey responses (all beside rest of aquaculture) was modelled individually. These were then scaled using a scaling factor based on surveyed GVP vs population GVP before being combined into a total 'other species' business model. As there were no survey responses for the rest of aquaculture category, the GVP and associated costs were allocated using a weighted average by GVP across the remaining three categories. Table 2-1 presents the population and sample GVP alongside the associated scaling factor for each subcategory within 'other species'.

Table 2-1 GVP and scaling factors of other species subcategories

	Redclaw	Oyster	Aquarium/ hatchery	Rest of Aquaculture
Population GVP ($m)	0.9	0.4	5.2	1.4
Sample GVP ($m)	0.1	0.2	1.3	-
Scale-up factor	14.0	2.3	4.9	-

Source: BDO analysis, Department of Agriculture and Fisheries

Stage 5: Back cast sector wide business models to 2019/20 and 2020/21

The 2019/20 and 2020/21 economic indicators for Queensland's aquaculture businesses were calculated by back casting the 2021/22 indicators using a range of primary and secondary data about those years.

Aquaculture monitoring data were obtained from DAF for 2019/20 and 2020/21 to adjust the farming production and revenues for those years. The back casting process involved adjusting operating costs and employment for each business based on the difference in production and revenue between 2019/20, 2020/21 and 2021/22. Lastly, input prices were adjusted in line with changes in relevant cost indices (see Table 2-2).

Table 2-2 Cost adjustments for business level back casting, percentage change from 2021/22

	2019/20	2020/21
GVP		
Prawns	-25%	-12%
Barramundi	-39%	-25%
Freshwater Fish	-4%	1%
Other	10%	9%
Production		
Prawns	-28%	-8%
Barramundi	-27%	-13%
Freshwater Fish	20%	14%
Other	41%	12%
RBA Indicator Lending Rate [a]:	11%	-1%
Wage Price Index [b]	-4%	-2%
Consumer Price Index and components [c]		
Consumer Price Index	-11%	-7%
Automotive fuel component of CPI	20%	-11%
Electricity component of CPI	8%	1%

[a] Variable weighted average rate on credit outstanding for businesses.

[b] For ordinary time hourly rates of pay excluding bonuses in public and private sectors.

[c] For all groups in Brisbane.

Source: BDO analysis, Department of Agriculture and Fisheries

Stage 6: Model regional business models based on sector wide business models

Regional business models were then generated based on the percentage of total species GVP captured by each respective region, as shown in Table 2-3.

Stage 7: Calculate indicators for each sector and region

The economic and financial indicators were calculated based on the sector and region wide business models. The definitions of indicators are presented in the Glossary.

Unlike commercial fisheries, aquaculture businesses do not require tradable licences or permits to operate. While they do require permits and licences, these are not tradeable in the same way that commercial fishing licences are. Investment by businesses in obtaining permits can be thought of as 'setup costs' rather than buying an asset that could be on-sold. Survey participants were asked for the value of permits (e.g. DA, EA, RAA, Broodstock collection permit) and almost all responded with a value of zero, confirming this interpretation. Because of this, licence or permit values have not been calculated, nor any indicators associated with them such as return on investment (including licence/permit value) and net economic return. The indicators in this report differ from those reported for commercial fisheries for this reason.

Table 2-3 Percentage of total species GVP, by year, by region[a]

	SEQ	Cairns	MIW	Townsville	Wide Bay	Rest of QLD
Prawns						
2019/20	11%	26%	37%	16%	3%	6%
2020/21	13%	20%	46%	15%	2%	5%
2021/22	10%	15%	62%	9%	1%	3%
Barramundi						
2019/20	0%	54%	29%	11%	0%	5%
2020/21	0%	65%	17%	15%	0%	3%
2021/22	0%	59%	28%	10%	0%	2%
Freshwater fish						
2019/20	0%	0%	0%	0%	69%	31%
2020/21	0%	0%	0%	0%	52%	48%
2021/22	0%	0%	0%	0%	58%	42%
Other species						
2019/20	18%	26%	6%	3%	35%	12%
2020/21	23%	34%	2%	2%	33%	7%
2021/22	22%	31%	4%	1%	37%	6%

[a] The sum of each row equals 100 per cent, but may not appear so due to rounding.

Source: BDO analysis, DAF (2022)

2.2. Survey of aquaculture farming businesses

The survey of aquaculture businesses to collect information on the 2021/22 financial year was undertaken between August and November 2023. Data were collected on species farmed, revenue by species, production by species, operating and processing costs, employment (including unpaid), leasing costs, capital value and depreciation, and social and demographic information. The survey questionnaire was developed in collaboration with DAF and industry representatives. Businesses were asked to include only the amounts that were attributable to their aquaculture business within Queensland. If exact figures were not available, then they were asked to provide careful estimates.

Businesses were invited to participate through multiple email and phone call invitations, as well as through the endorsement of various industry associations and DAF. They were invited to respond through an online survey or over the phone with an experienced interviewer.

As aquaculture businesses are generally larger and more vertically integrated than fishing businesses, the total number of businesses is much smaller, and income is more concentrated. As such the percentage of total species GVP captured by the survey is a good measure of sample size alongside the number of businesses surveyed. This is because it is possible to capture a high number of businesses without capturing the largest few businesses, which would look like a good sample on face value but is not necessarily a representative sample size in terms of total aquaculture production.

Overall, 42 survey responses were received. The specific number of responses per sector cannot be published alongside the GVP due to confidentiality constraints. The sample size from the survey in terms of the

surveyed businesses GVP against the total GVP by species is presented in Table 2-4. The sample sizes for prawns, barramundi and freshwater fish were sufficient to prepare economic and social indicators for these individual sectors. The sample size for 'other species' was much lower, and the range of businesses within this category is much broader. This means that, although indicators were prepared, they should be used with caution.

Table 2-4 Survey sample for 2021/22 in Queensland's aquaculture, by species

	Surveyed GVP ($m)	Total GVP ($m)	% of total GVP surveyed
Prawns	105.6	167.1	63%
Barramundi	25.0	46.3	54%
Freshwater Fish	3.0	3.4	88%
Other	1.6	7.9	20%

Source: BDO analysis, DAF (2022)

3. Economic indicators for Queensland's aquaculture industry

3.1. Production, gross value of production and price

Table 3-1 and Table 3-2 present the production and total GVP for QLD aquaculture by sector and region by year. Price is also included for species where applicable. Price is not published for the regions as they have mixed species production. The total production of QLD aquaculture in 2021/22 was 13,023 tonnes, which was higher than the production of 9,536 tonnes in 2019/20. Similarly, the total GVP for QLD aquaculture in 2021/22 of $224.7 million was considerably higher than the $164.9 million GVP in 2019/20.

Table 3-1 Production, value of production and price, by species, 2019/20 to 2021/22[a]

	Prawns	Barramundi	Freshwater Fish	Other				Total
				Redclaw	Oysters[b]	Aquarium/ Hatchery	Rest of aquaculture[c]	
2019/20								
Production (tonnes)	6,245	2,904	235	62	56[b]	n.a.	89	9,536
GVP ($m)	124.6	28.3	3.2	1.8	0.5	4.8	1.6	164.9
Price ($/kg)	19.80	9.76	13.70	28.99	9.16	-	-	-
2020/21								
Production (tonnes)	8,003	3,478	224	33	87[b]	n.a.	87	11,825
GVP ($m)	146.6	34.9	3.4	0.9	0.7	5.4	1.6	193.5
Price ($/kg)	18.22	10.04	15.06	29.12	8.03	-	-	-
2021/22								
Production (tonnes)	8,727	3,992	197	31	51[b]	n.a.	76	13,023
GVP ($m)	167.1	46.3	3.4	0.9	0.4	5.2	1.4	224.7
Price ($/kg)	19.09	11.60	17.08	27.25	8.76	-	-	-

[a] "n.a." = not available, as the data has not been provided.

[b] For oysters, production is in thousands of dozens and is not included in the total tonnes, price is $/dozen.

[c] 'rest of aquaculture' refers to the 'Other' category defined in DAF (2022) and explained in Section 1.1.

Source: BDO analysis, DAF (2022)

Table 3-2 Production and value of production, by region, 2019/20 to 2021/22

	SEQ	Cairns	MIW	Townsville	Wide Bay	Rest of QLD
2019/20						
Production (tonnes)	723	3,476	2,973	1,362	432	570
GVP ($m)	15.9	50.6	55.1	24.0	8.8	30.2
2020/21						
Production (tonnes)	1,161	3,603	4,364	1,851	289	556
GVP ($m)	21.1	54.2	73.2	27.8	7.0	23.8
2021/22						
Production (tonnes)	1,015	3,642	6,368	1,276	273	450
GVP ($m)	19.1	54.0	116.3	19.4	7.3	8.7

Source: BDO analysis, DAF (2022)

3.2. Financial indicators

The major measures of the financial performance of aquaculture businesses in Queensland for 2019/20 to 2021/22 are presented in this section. These are presented as the total for all businesses within each sector (Table 3-3 to Table 3-6). These estimates are based on the 2021/22 survey. As such, the estimates for 2019/20 and 2020/21 are based on back casting estimates as described in Section 2.2.

When reading these tables, it is important to consider the survey sample size for each species as presented in Section 2.2. The total financial performance, as presented in these tables, masks variation in the financial performance and business structure of individual businesses in each sector.

The financial performance for 'other species', as presented in Table 3-6, should be used with caution. While care has been taken to represent this sector with the best information available, the wide range of business types, alongside a low survey response makes the results for this sector less reliable. This sector shows a negative gross margin, which would imply that the businesses would be better off closing and continuing to only pay their fixed costs than to continue operating. However, it is unlikely that the majority of businesses in this sector are running with a negative gross margin, and some were in a stock building phase (incurring cost to increase their stock with a view to sell it at a later time) when surveyed, which provides further reason to view these results with caution.

Table 3-3 Financial performance QLD, prawn, aquaculture, 2019/20 to 2021/22[a]

		2019/20		2020/21		2021/22	
		QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]
(1)	**Gross income**	**$124,637,371**		**$146,563,637**		**$167,139,755**	
	Variable costs						
	Wages	$28,380,787	32%	$31,300,959	31%	$37,295,484	32%
	Repairs, maintenance & replacement	$3,937,013	4%	$5,293,633	5%	$6,194,455	5%
	Fees paid to government	$184,615	0%	$193,716	0%	$207,855	0%
	Electricity	$8,699,736	10%	$8,148,600	8%	$8,039,636	7%
	Fuel & lubricants	$1,237,525	1%	$914,654	1%	$1,028,125	1%
	Freight, unloading & marketing	$2,168,210	2%	$1,619,339	2%	$1,817,328	2%
	Spat/parr/juvenile/larvae	$1,616,544	2%	$1,696,233	2%	$1,820,035	2%
	Tip and clean	$563,230	1%	$605,842	1%	$656,631	1%
	Feed	$30,889,660	35%	$41,533,652	41%	$48,601,476	42%
(2)	Labour - unpaid	$37,098	0%	$37,682	0%	$38,600	0%
	Packaging	$456,336	1%	$613,581	1%	$717,995	1%
	Other	$3,079,483	4%	$3,231,289	3%	$3,467,130	3%
(3)	**Total variable costs**	**$81,250,238**	**93%**	**$95,189,180**	**94%**	**$109,884,751**	**94%**
	Fixed costs						
	Insurances	$1,441,994	2%	$1,513,078	1%	$1,623,512	1%
	Repairs & maintenance	$61,572	0%	$64,607	0%	$69,323	0%
(4)	Rents and leasing	$980,275	1%	$895,177	1%	$917,186	1%
(5)	Interest	$2,796,964	3%	$2,481,393	2%	$2,515,248	2%
	Office, admin, professional services	$1,003,926	1%	$1,053,415	1%	$1,130,300	1%
	Travel	$277,051	0%	$290,708	0%	$311,926	0%
(6)	Labour - unpaid	$23,186	0%	$23,551	0%	$24,125	0%
(7)	**Total fixed costs**	**$6,584,967**	**7%**	**$6,321,930**	**6%**	**$6,591,620**	**6%**
(8)	**Total cash costs (3+7)**	**$87,835,205**	**100%**	**$101,511,110**	**100%**	**$116,476,370**	**100%**
	Farm gross margin (1-3)	$43,387,133		$51,374,457		$57,255,005	
(9)	Total unpaid labour (2+6)	$60,284		$61,233		$62,726	
	Gross operating surplus (1-8+9)	$36,862,450		$45,113,760		$50,726,111	
(10)	**Cash income (1-8)**	$36,802,166		$45,052,527		$50,663,385	
(11)	**Depreciation**	$11,352,770		$11,912,414		$12,781,860	
(12)	**Business profit (10-11)**	$25,449,396		$33,140,114		$37,881,525	
(13)	**Profit at full equity (12+4+5)**	$28,246,361		$35,621,507		$41,141,410	
(14)	**Farm capital**	**$195,667,027**		**$205,312,585**		**$220,297,648**	
	Rate of return on farm capital at full equity (13/14*100)	**14%**		**17%**		**19%**	

[a] Financial performance estimates are based on the 2021/22 survey.

[b] Total cash costs.

Source: BDO analysis

Table 3-4 Financial performance QLD, barramundi, aquaculture, 2019/20 to 2021/22[a]

		2019/20		2020/21		2021/22	
		QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]
(1)	**Gross income**	**$28,343,017**		**$34,905,785**		**$46,288,747**	
	Variable costs						
	Wages	$5,683,227	20%	$8,137,744	24%	$10,576,904	26%
	Repairs, maintenance & replacement	$1,838,393	7%	$2,309,902	7%	$2,844,577	7%
	Fees paid to government	$36,132	0%	$37,913	0%	$40,680	0%
	Electricity	$4,342,021	16%	$4,066,950	12%	$4,012,567	10%
	Fuel & lubricants	$211,889	1%	$156,607	0%	$176,035	0%
	Freight, unloading & marketing	$2,081,919	7%	$1,574,916	5%	$1,764,050	4%
	Spat/parr/juvenile/larvae	$581,398	2%	$610,059	2%	$654,585	2%
	Tip and clean	$61,588	0%	$70,579	0%	$81,453	0%
	Feed	$12,290,293	44%	$15,442,492	46%	$19,016,977	47%
(2)	Labour - unpaid	$0	0%	$0	0%	$0	0%
	Packaging	$113,529	0%	$142,647	0%	$175,665	0%
	Other	$36,132	0%	$37,913	0%	$40,680	0%
(3)	**Total variable costs**	**$27,276,521**	**98%**	**$32,587,721**	**98%**	**$39,384,174**	**98%**
	Fixed costs						
	Insurances	$73,989	0%	$77,636	0%	$83,302	0%
	Repairs & maintenance	$85,403	0%	$89,613	0%	$96,154	0%
(4)	Rents and leasing	$56,254	0%	$58,694	0%	$62,870	0%
(5)	Interest	$246,746	1%	$218,906	1%	$221,893	1%
	Office, admin, professional services	$149,548	1%	$153,765	0%	$162,722	0%
	Travel	$20,530	0%	$21,542	0%	$23,114	0%
(6)	Labour - unpaid	$28,180	0%	$28,624	0%	$29,322	0%
(7)	**Total fixed costs**	**$660,650**	**2%**	**$648,780**	**2%**	**$679,376**	**2%**
(8)	**Total cash costs (3+7)**	**$27,937,172**	**100%**	**$33,236,502**	**100%**	**$40,063,550**	**100%**
	Farm gross margin (1-3)	$1,066,495		$2,318,063		$6,904,573	
(9)	Total unpaid labour (2+6)	$28,180		$28,624		$29,322	
	Gross operating surplus (1-8+9)	$434,025		$1,697,907		$6,254,519	
(10)	**Cash income (1-8)**	$405,845		$1,669,283		$6,225,197	
(11)	**Depreciation**	$4,076,858		$4,277,830		$4,590,054	
(12)	**Business profit (10-11)**	-$3,671,013		-$2,608,547		$1,635,143	
(13)	**Profit at full equity (12+4+5)**	-$3,424,267		-$2,389,640		$1,858,885	
(14)	**Farm capital**	**$123,325,367**		**$129,404,787**		**$138,849,599**	
	Rate of return on farm capital at full equity (13/14*100)	**-3%**		**-2%**		**1%**	

[a] Financial performance estimates are based on the 2021/22 survey.

[b] Total cash costs.

Source: BDO analysis

Table 3-5 Financial performance QLD, freshwater fish, aquaculture, 2019/20 to 2021/22[a]

		2019/20		2020/21		2021/22	
		QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]
(1)	**Gross income**	**$3,222,614**		**$3,376,815**		**$3,357,287**	
	Variable costs						
	Wages	$618,690	26%	$458,075	21%	$537,845	23%
	Repairs, maintenance & replacement	$331,470	14%	$331,393	15%	$311,800	13%
	Fees paid to government	$3,036	0%	$3,186	0%	$3,418	0%
	Electricity	$281,388	12%	$263,562	12%	$260,037	11%
	Fuel & lubricants	$86,699	4%	$64,079	3%	$72,029	3%
	Freight, unloading & marketing	$120,497	5%	$89,060	4%	$100,108	4%
	Spat/parr/juvenile/larvae	$182,168	8%	$191,148	9%	$205,100	9%
	Tip and clean	$25,662	1%	$26,220	1%	$26,248	1%
	Feed	$495,541	21%	$519,969	24%	$557,920	24%
(2)	Labour - unpaid	$77,177	3%	$78,393	4%	$80,304	3%
	Packaging	$38,935	2%	$38,926	2%	$36,625	2%
	Other	$12,817	1%	$13,449	1%	$14,430	1%
(3)	**Total variable costs**	**$2,274,082**	**95%**	**$2,077,460**	**94%**	**$2,205,864**	**94%**
	Fixed costs						
	Insurances	$11,928	0%	$12,516	1%	$13,429	1%
	Repairs & maintenance	$24,940	1%	$26,169	1%	$28,079	1%
(4)	Rents and leasing	$11,602	0%	$12,174	1%	$13,063	1%
(5)	Interest	$23,079	1%	$20,475	1%	$20,754	1%
	Office, admin, professional services	$30,199	1%	$31,241	1%	$33,201	1%
	Travel	$5,422	0%	$5,689	0%	$6,104	0%
(6)	Labour - unpaid	$16,787	1%	$17,051	1%	$17,467	1%
(7)	**Total fixed costs**	**$123,955**	**5%**	**$125,315**	**6%**	**$132,097**	**6%**
(8)	**Total cash costs (3+7)**	**$2,398,037**	**100%**	**$2,202,775**	**100%**	**$2,337,961**	**100%**
	Farm gross margin (1-3)	$948,532		$1,299,355		$1,151,423	
(9)	Total unpaid labour (2+6)	$93,964		$95,444		$97,770	
	Gross operating surplus (1-8+9)	$918,541		$1,269,485		$1,117,097	
(10)	**Cash income (1-8)**	$824,577		$1,174,040		$1,019,326	
(11)	**Depreciation**	$772,647		$810,735		$869,908	
(12)	**Business profit (10-11)**	$51,930		$363,305		$149,418	
(13)	**Profit at full equity (12+4+5)**	$75,009		$383,780		$176,277	
(14)	**Farm capital**	**$15,686,746**		**$16,460,036**		**$17,661,398**	
	Rate of return on farm capital at full equity (13/14*100)	**0%**		**2%**		**1%**	

[a] Financial performance estimates are based on the 2021/22 survey.

[b] Total cash costs.

Source: BDO analysis

Table 3-6 Financial performance QLD, other species, aquaculture, 2019/20 to 2021/22[a]

		2019/20		2020/21		2021/22	
		QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]	QLD Total	Share of TCC[b]
(1)	**Gross income**	**$8,672,020**		**$8,655,283**		**$7,908,977**	
	Variable costs						
	Wages	$4,368,205	35%	$4,488,563	36%	$3,694,195	31%
	Repairs, maintenance & replacement	$1,047,012	8%	$872,494	7%	$837,979	7%
	Fees paid to government	$70,440	1%	$73,912	1%	$79,307	1%
	Electricity	$1,109,393	9%	$1,039,112	8%	$1,025,217	9%
	Fuel & lubricants	$135,283	1%	$99,988	1%	$112,392	1%
	Freight, unloading & marketing	$76,499	1%	$56,540	0%	$63,554	1%
	Spat/parr/juvenile/larvae	$461,357	4%	$484,100	4%	$519,433	4%
	Tip and clean	$36,220	0%	$37,882	0%	$40,593	0%
	Feed	$1,304,846	11%	$1,369,170	11%	$1,469,101	12%
(2)	Labour - unpaid	$745,378	6%	$757,121	6%	$775,573	6%
	Packaging	$30,807	0%	$25,672	0%	$24,656	0%
	Other	$937,696	8%	$983,920	8%	$1,055,733	9%
(3)	**Total variable costs**	**$10,323,136**	**83%**	**$10,288,475**	**83%**	**$9,697,735**	**81%**
	Fixed costs						
	Insurances	$265,700	2%	$278,798	2%	$299,147	3%
	Repairs & maintenance	$679,474	5%	$712,969	6%	$765,006	6%
(4)	Rents and leasing	$364,550	3%	$382,520	3%	$410,439	3%
(5)	Interest	$189,570	2%	$168,181	1%	$170,476	1%
	Office, admin, professional services	$153,592	1%	$160,722	1%	$172,135	1%
	Travel	$33,036	0%	$34,665	0%	$37,195	0%
(6)	Labour - unpaid	$381,401	3%	$387,410	3%	$396,852	3%
(7)	**Total fixed costs**	**$2,067,322**	**17%**	**$2,125,265**	**17%**	**$2,251,250**	**19%**
(8)	**Total cash costs (3+7)**	**$12,390,459**	**100%**	**$12,413,740**	**100%**	**$11,948,985**	**100%**
	Farm gross margin (1-3)	-$1,651,116		-$1,633,191		-$1,788,758	
(9)	Total unpaid labour (2+6)	$1,126,779		$1,144,531		$1,172,425	
	Gross operating surplus (1-8+9)	-$2,591,659		-$2,613,926		-$2,867,582	
(10)	**Cash income (1-8)**	-$3,718,439		-$3,758,456		-$4,040,008	
(11)	**Depreciation**	$1,425,753		$1,496,037		$1,605,228	
(12)	**Business profit (10-11)**	-$5,144,192		-$5,254,493		-$5,645,235	
(13)	**Profit at full equity (12+4+5)**	-$4,954,622		-$5,086,312		-$5,114,592	
(14)	**Farm capital**	**$45,997,073**		**$48,264,534**		**$51,787,197**	
	Rate of return on farm capital at full equity (13/14*100)	**-11%**		**-11%**		**-10%**	

[a] Financial performance estimates are based on the 2021/22 survey.

[b] Total cash costs.

Source: BDO analysis

3.3. State and regional economic contribution

This section presents the economic contribution of aquaculture to Queensland by sector (Section 3.3.2) and by region (Section 3.3.3) over the three years, 2019/20, 2020/21 and 2021/22. Due to survey responses and confidentiality constraints, the reported sectors are prawns, barramundi, freshwater fish and other species which incorporates redclaw, edible oysters, aquarium/hatchery and rest of aquaculture. The economic contribution indicators presented are output, gross state product/gross regional product, household income and employment. The economic indicators are reported in terms of direct, flow on and total contributions.

Contribution analysis is a descriptive analysis which traces the gross economic activity of the aquaculture sector through the regional and state economies. The analysis has utilised the detailed industry specific data reported above in combination with other regional/state data that highlight the current linkages that exist within the economy. The analysis has been undertaken within a modelling framework known as input-output analysis, with the purpose being to determine how much direct and indirect economic activity is associated with QLD aquaculture. This is because the contribution of aquaculture extends beyond the initial round of output, income and employment generated by the businesses. These indirect or flow-on effects are part of the contribution of fishing related businesses to the economy and must be added to the direct effects to get a full appreciation of the economic contribution of the sector. This method was recommended by the National Fisheries and Aquaculture Industry Contributions Study (FRDC project 2017-210) (BDO EconSearch 2019).

The terms 'contribution', and 'impact' are often used interchangeably, particularly in the context of regional economic analysis where decision makers wish to use the results from such analyses to inform policy decisions, to facilitate industry development or support a particular business strategy. However, they are distinctly different types of analysis. At the most basic level, a contribution analysis can be thought of as a 'footprint' or 'snapshot' analysis of economic activity, whereas an impact analysis can be thought of as an analysis of a change in economic activity. An economic impact analysis is an appropriate approach where an industry is generating new revenues that would otherwise not occur, keeping revenues in the region that would otherwise be lost, or being subject to changes that result in existing revenues being lost. Economic impact analysis will generally require more data than a contribution analysis and may require more sophisticated models, such as an extended input-output model, a properly specified computable general equilibrium (CGE) model or means to estimate people's likely behaviour in response to the change (Watson et al. 2014).

3.3.1. Measuring direct and flow-on effects

The following stages in the supply chain have been included in the quantifiable economic contribution:

- the value of production
- net value of business processing.

Each of these activities generates flow-on effects to other sectors through purchases of inputs and the employment of labour. As noted above, these flow-on effects have been estimated using input-output analysis.

Local processing includes the first value-adding step after product is farmed by aquaculture businesses, only processing undertaken by aquaculture businesses has been included in this analysis. Processing activities include cleaning, filleting, cooking, smoking, freezing, packaging for retail or export, etc.

In order to compile a representative cost structure for the aquaculture sector, costs per dollar value of production were derived from survey data provided by aquaculture farming operators an item-by-item basis,

the expenditures were allocated between those occurring in the region, those occurring in Queensland and those goods and services imported from outside the state.

Estimates of the net value of local (i.e. regional and state) processing activity and capital expenditure per business were derived from the survey of aquaculture businesses and regional economic models.

Economic contributions have been specified in terms of the following economic indicators:

- value of output
- employment (fte and total jobs)
- household income
- contribution to gross state or regional product.

Value of output is a measure of the gross revenue of goods and services produced by commercial organisations plus gross expenditure by government agencies. This indicator needs to be used with care as it includes elements of double counting.

Employment is a measure of the number of working proprietors, managers, directors and other employees, in terms of the number of full-time equivalent jobs or total jobs.

Household income is a component of Gross State Product (GSP) and Gross Regional Product (GRP) and is a measure of wages and salaries, drawings by owner operators and other payments to labour including overtime payments and income tax but excluding payroll tax.

Contribution to GSP or GRP is a measure of the net contribution of an activity to the state/regional economy. Contribution to GSP or GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. It can also be measured as household income plus other value added (gross operating surplus and all taxes, less subsidies). It represents payments to the primary inputs of production (labour, capital and land). Using GSP or GRP as a measure of economic contribution avoids the problem of double counting that may arise from using value of output for this purpose.

3.3.2. Economic contribution results by sector

Table 3-7 to Table 3-9 present, by year, the economic contribution of the four sectors, prawns, barramundi, freshwater fish, and other species, to Queensland over the three years 2019/20 to 2021/22. Appendix 1 presents detailed tables of the economic contribution results by sector.

Table 3-7 Economic contribution to QLD, by species, 2019/20[a,b]

	Output ($m)	Gross Regional Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct					
Prawns	124.6	70.8	28.4	505	813
Barramundi	28.1	6.8	5.7	100	136
Freshwater Fish	3.1	1.5	0.7	47	60
Other species	8.7	2.6	5.5	121	135
Total direct	**164.5**	**81.6**	**40.4**	**773**	**1,164**
Flow-on					
Prawns	121.4	60.0	35.0	415	434
Barramundi	38.6	18.0	10.4	127	131
Freshwater Fish	3.7	1.8	1.1	13	14
Other species	20.8	10.7	6.6	76	81
Total flow-on	**184.5**	**90.6**	**53.0**	**631**	**660**
Total					
Prawns	246.0	130.7	63.4	920	1,247
Barramundi	66.7	24.8	16.1	228	267
Freshwater Fish	6.8	3.3	1.8	60	73
Other species	29.5	13.3	12.1	197	216
Total	**349.0**	**172.2**	**93.4**	**1,404**	**1,824**

[a] Totals may not sum due to rounding.

[b] Output for barramundi and freshwater fish are not equal to their total GVP to avoid the double counting of hatchery sales within the State.

Source: BDO analysis

Table 3-8 Economic contribution to QLD, by species, 2020/21[a, b]

	Output ($m)	Gross Regional Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct					
Prawns	146.6	81.5	31.4	548	883
Barramundi	34.7	10.5	8.2	142	192
Freshwater Fish	3.2	1.6	0.6	34	44
Other species	8.7	2.7	5.6	122	147
Total direct	**193.1**	**96.3**	**45.7**	**846**	**1,287**
Flow-on					
Prawns	136.0	67.2	39.6	471	494
Barramundi	44.3	21.0	12.2	149	155
Freshwater Fish	3.4	1.7	1.0	12	12
Other species	20.7	10.7	6.5	76	80
Total flow-on	**204.4**	**100.6**	**59.3**	**708**	**741**
Total					
Prawns	282.6	148.7	71.0	1,019	1,377
Barramundi	78.9	31.5	20.3	291	347
Freshwater Fish	6.6	3.3	1.5	46	56
Other species	29.4	13.4	12.2	198	227
Total	**397.5**	**196.9**	**105.0**	**1,554**	**2,028**

[a] Totals may not sum due to rounding.

[b] Output for barramundi and freshwater fish are not equal to their total GVP to avoid the double counting of hatchery sales within the State.

Source: BDO analysis

Table 3-9 Economic contribution to QLD, by species, 2021/22[a, b]

	Output ($m)	Gross Regional Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct					
Prawns	167.1	93.3	37.4	638	1,065
Barramundi	46.0	17.5	10.6	180	171
Freshwater Fish	3.2	1.5	0.6	39	45
Other species	7.9	1.7	4.9	98	155
Total direct	**224.3**	**114.1**	**53.5**	**955**	**1,462**
Flow-on					
Prawns	154.8	76.8	45.4	540	567
Barramundi	52.5	25.2	14.7	179	187
Freshwater Fish	3.6	1.8	1.0	12	13
Other species	20.0	10.3	6.3	72	77
Total flow-on	**230.8**	**114.0**	**67.5**	**804**	**843**
Total					
Prawns	322.0	170.1	82.8	1,177	1,632
Barramundi	98.5	42.7	25.3	359	358
Freshwater Fish	6.7	3.3	1.7	52	57
Other species	27.9	12.0	11.2	171	231
Total	**455.1**	**228.1**	**120.9**	**1,759**	**2,305**

[a] Totals may not sum due to rounding.

[b] Output for barramundi and freshwater fish are not equal to their total GVP to avoid the double counting of hatchery sales within the State.

Source: BDO analysis

Prawns

This section discusses the economic contribution results of prawn aquaculture to Queensland. The production and profitability of prawns both grew considerably over the three-year period, and as such the contributions have also increased.

The value of output of aquaculture farming and processing generated directly has grown across the three years from $124.6 million in 2019/20 to $167.1 million in 2021/22. Flow-on output is a biased indicator of economic contribution due to double-counting of values so in not interpreted further here.

The contribution to the GSP of Queensland directly from prawn farming and processing activities grew across the three years, from $70.8 million in 2019/20 to $93.3 million in 2021/22. The total estimated contribution, including flow-on contribution, of the prawn aquaculture sector to Queensland's GSP was $130.7 million in 2019/20 increasing to $170.1 million in 2021/22.

Personal income earned directly in prawn farming and processing in Queensland has increased over the three years, from $28.4 million in 2019/20 to $37.4 million in 2021/22. Flow-on income of prawn aquaculture activity earned by wage earners in other businesses in Queensland has grown similarly from $35.0 million in 2019/20 to $45.4 million in 2021/22. The total household income contribution from prawn aquaculture in Queensland was $63.4 million in 2019/20, increasing to $82.8 million in 2021/22.

The fte jobs prawn farming and processing directly contributed to Queensland increased over the three years, from 505 fte jobs in 2019/20 to 638 fte jobs in 2021/22. Additionally, the flow on effects generated by prawn aquaculture followed a similar upward trend, but at a slower rate, to direct employment. The total contribution to fte jobs in Queensland of the prawn aquaculture sector was 920 fte jobs in 2019/20, increasing to 1,177 fte jobs in 2021/22.

Barramundi

This section discusses the economic contribution of the barramundi aquaculture sector to Queensland. The production and profitability of barramundi grew over the three-year period, and as such the contributions have also increased.

The value of output of barramundi farming and processing generated directly has grown across the three years from $28.1 million in 2019/20 to $46.0 million in 2021/22. Flow-on output is a biased indicator of economic contribution due to double-counting of values so in not interpreted further here.

The contribution to the GSP of Queensland directly from barramundi farming and processing activities grew as profitability grew across the three years, from $6.8 million in 2019/20 to $17.5 million in 2021/22. The flow on contribution to GSP followed an upward trend across the three years, but at a slower rate than direct contributions. The total estimated contribution of the barramundi aquaculture sector to Queensland's GSP was $24.8 million in 2019/20, increasing to $42.7 million in 2021/22.

Personal income earned directly in barramundi farming and processing in Queensland has increased over the three years, from $5.7 million in 2019/20 to $10.6 million in 2021/22. Flow-on income of barramundi aquaculture activity earned by wage earners in other businesses in Queensland has grown similarly from $10.4 million in 2019/20 to $14.7 million in 2021/22. The total household income contribution from barramundi aquaculture in Queensland was $16.1 million in 2019/20, increasing to $25.3 million in 2021/22.

The fte jobs barramundi farming and processing directly contributed to Queensland increased over the three years, from 100 fte jobs in 2019/20 to 180 fte jobs in 2021/22. Additionally, the flow on effects generated by barramundi aquaculture followed a slower upward trend. The total contribution to fte jobs in Queensland of the barramundi aquaculture sector was 228 fte jobs in 2019/20, increasing to 359 fte jobs in 2021/22.

Freshwater fish

This section discusses the economic contribution results of freshwater fish aquaculture to Queensland.

The value of output of freshwater fish farming and processing generated directly has grown slightly across the three years from $3.1 million in 2019/20 to $3.2 million in 2021/22. Flow-on output is a biased indicator of economic contribution due to double-counting of values so in not interpreted further here.

The contribution to the GSP of Queensland directly from freshwater fish farming and processing activities remained steady, from $1.5 million in 2019/20, to $1.6 million in 2020/21, to $1.5 million in 2021/22. The flow on contribution to GSP followed a similar trend to direct employment. The total estimated contribution of the freshwater fish aquaculture sector to Queensland's GSP was $3.3 million across the three years.

Personal income earned directly in freshwater fish farming and processing in Queensland has decreased slightly over the three years from $0.7 million in 2019/20 to $0.6 million in 2021/22. Flow-on income of freshwater based aquaculture activity earned by wage earners in other businesses in Queensland followed a similar trend to direct income. The total household income contribution from freshwater fish aquaculture in Queensland was $1.8 million in 2019/20, decreasing slightly to $1.7 million in 2021/22.

The fte jobs freshwater fish farming and processing directly contributed to Queensland decreased over the three years, from 47 fte jobs in 2019/20 to 39 fte jobs in 2021/22. The flow on effects generated by

freshwater species aquaculture slightly decreased from 13 fte jobs in 2019/20 to 12 fte jobs in 2021/22. The total contribution to fte jobs in Queensland of the freshwater fish aquaculture sector was 60 fte jobs in 2019/20, decreasing to 52 fte jobs in 2021/22.

Other species

This section discusses the economic contribution results of other species aquaculture to Queensland. Due to the variance in farm and business types within this sector, the survey responses are too low to have a high degree of confidence in these results.

The value of output of other species farming and processing generated directly remained steady in the first two years at $8.7 million before falling in 2021/22 to $7.9 million. Flow-on output is a biased indicator of economic contribution due to double-counting of values so in not interpreted further here.

The contribution to the GSP of Queensland directly from other species farming and processing activities was $2.6 million in 2019/20, grew to $2.7 million in 2020/21 before falling to $1.7 million in 2021/22. The flow on contribution was considerably higher than direct contribution and fell over the three years from $10.7 million in 2019/20 to $10.3 million in 2021/22. The total estimated contribution of the other species aquaculture sector to Queensland's GSP was $13.3 million in 2019/20, decreasing to $12.0 million in 2021/22.

Personal income earned directly in other species farming and processing in Queensland has decreased over the three years from $5.5 million in 2019/20 to $4.9 million in 2021/22. Flow-on income of other species aquaculture activity earned by wage earners in other businesses in Queensland has followed a similar trend to direct income. The total household income contribution from other species aquaculture in Queensland was $12.1 million in 2019/20, $12.2 million in 2020/21 and $11.2 million in 2021/22.

The fte jobs other species farming and processing directly contributed to Queensland decreased over the three years, from 121 fte jobs in 2019/20 to 98 fte jobs in 2021/22. The flow on effects generated by other species aquaculture was less than direct employment but followed a similar decreasing trend. The total contribution to fte jobs in Queensland of the other species aquaculture sector was 197 fte jobs in 2019/20, decreasing to 171 fte jobs in 2021/22.

3.3.3. Economic contribution results by region

Table 3-10 to Table 3-12 present the estimates, by year, of the economic contribution of the QLD aquaculture sector to reportable regions in the years 2019/20 to 2021/22. Appendix 2 presents detailed economic contribution result tables by region. The interpretation of the results by region is similar to the interpretation of results by sector (Section 3.3.2).

Table 3-10 QLD aquaculture economic contribution to regions 2019/20[a]

	Output ($m)	Gross Regional Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct					
SEQ	15.9	8.6	4.3	80	118
Cairns	50.6	23.0	12.0	219	324
MIW	55.1	28.4	12.6	224	350
Townsville	24.0	12.5	5.5	99	154
Wide Bay	8.8	4.0	3.2	89	111
QLD[b]	**164.5**	**81.6**	**40.4**	**773**	**1,164**
Flow-on					
SEQ	13.9	7.2	4.4	50	53
Cairns	37.2	18.4	10.0	123	121
MIW	32.2	15.9	8.0	97	99
Townsville	17.7	8.8	4.8	59	62
Wide Bay	10.1	5.1	2.9	37	39
QLD[b]	**184.5**	**90.6**	**53.0**	**631**	**660**
Total					
SEQ	29.8	15.7	8.7	130	171
Cairns	87.8	41.4	22.1	343	445
MIW	87.3	44.3	20.5	321	449
Townsville	41.7	21.3	10.3	157	216
Wide Bay	18.9	9.1	6.1	126	150
QLD[b]	**349.0**	**172.2**	**93.4**	**1,404**	**1,824**

[a] Totals may not sum due to rounding.

[b] As some regions data are confidential and not reported, the sums of the included regions are not equal to the total for Queensland. Additionally, the sum of the unreported regions will not equate to the difference between QLD and the reported regions because of a higher level of flow-ons at the state level than at the regional level (resulting from lower imports and leakages).

Source: BDO analysis

Table 3-11 QLD aquaculture economic contribution to regions 2020/21[a]

	Output ($m)	Gross Regional Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct					
SEQ	21.1	11.2	5.4	99	148
Cairns	54.2	23.5	13.3	240	347
MIW	73.2	39.1	15.9	278	439
Townsville	27.8	14.1	6.1	107	166
Wide Bay	7.0	3.1	2.6	67	85
QLD[b]	**193.1**	**96.3**	**45.7**	**846**	**1,287**
Flow-on					
SEQ	17.2	8.9	5.5	63	67
Cairns	38.9	19.5	10.7	132	129
MIW	37.9	19.0	9.7	117	121
Townsville	19.2	9.7	5.3	65	69
Wide Bay	8.2	4.2	2.4	30	32
QLD[b]	**204.4**	**100.6**	**59.3**	**708**	**741**
Total					
SEQ	38.3	20.1	10.9	162	215
Cairns	93.1	43.0	24.0	372	476
MIW	111.0	58.1	25.5	395	561
Townsville	47.0	23.7	11.4	172	235
Wide Bay	15.2	7.3	5.0	97	117
QLD[b]	**397.5**	**196.9**	**105.0**	**1,554**	**2,028**

[a] Totals may not sum due to rounding.

[b] The rest of Queensland's regions were not reported due to confidentiality reasons and therefore, the sums of the included regions are not equal to the total for Queensland.

Source: BDO analysis

Table 3-12 QLD aquaculture economic contribution to regions 2021/22[a]

	Output ($m)	Gross Regional Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct					
SEQ	19.1	10.1	4.9	88	145
Cairns	54.0	24.3	13.2	229	303
MIW	116.3	62.4	26.2	447	710
Townsville	19.4	9.9	4.4	75	112
Wide Bay	7.3	3.0	2.7	69	99
QLD[b]	**224.3**	**114.1**	**53.5**	**955**	**1,462**
Flow-on					
SEQ	15.7	8.1	5.0	58	61
Cairns	36.8	18.6	10.3	126	124
MIW	59.3	30.0	15.3	186	193
Townsville	13.1	6.7	3.7	45	48
Wide Bay	8.9	4.6	2.6	33	35
QLD[b]	**230.8**	**114.0**	**67.5**	**804**	**843**
Total					
SEQ	34.8	18.2	10.0	145	206
Cairns	90.8	42.9	23.4	355	427
MIW	175.6	92.4	41.5	633	902
Townsville	32.4	16.6	8.1	120	159
Wide Bay	16.3	7.6	5.3	102	134
QLD[b]	**455.1**	**228.1**	**120.9**	**1,759**	**2,305**

[a] Totals may not sum due to rounding.

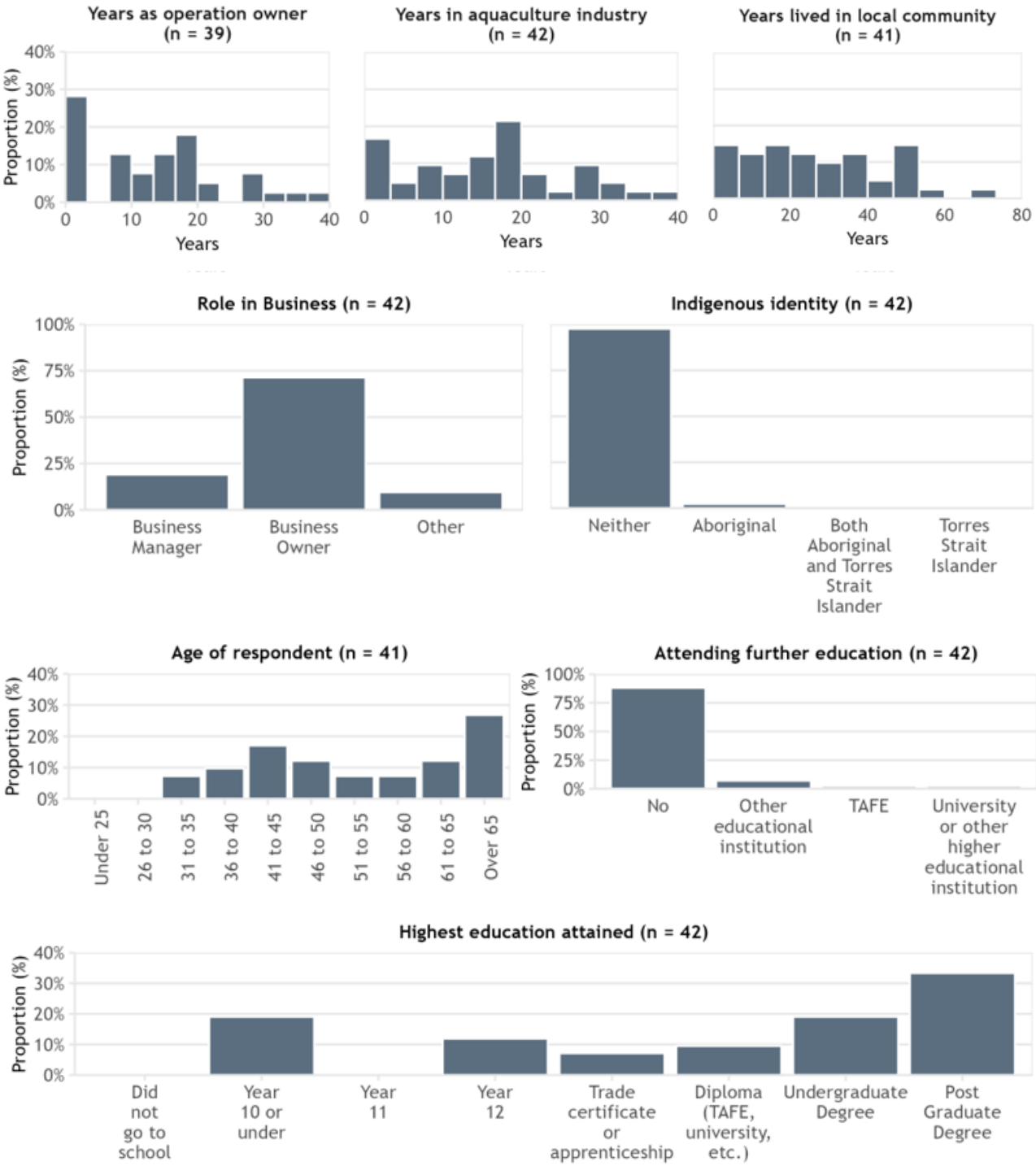
[b] The rest of Queensland's regions were not reported due to confidentiality reasons and therefore, the sums of the included regions are not equal to the total for Queensland.

Source: BDO analysis

4. Demographic indicators

Figure 4-1 presents a demographic profile of aquaculture business survey respondents in Queensland in 2021/22. These indicators are calculated from unweighted 2021/22 survey data, including businesses without production for the year, and have not been expanded to the whole aquaculture sector.

Figure 4-1 Demographic profile of Queensland's aquaculture industry, 2021/22



Source: BDO analysis

5. Social indicators

Aquaculture operators may derive non-financial benefits or costs from the operation of an aquaculture business and may contribute to the community in different ways. This section presents a series of social indicators including:

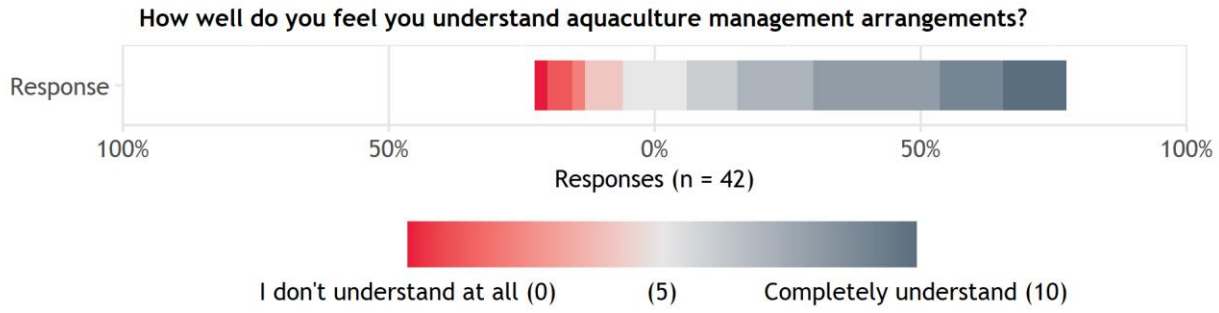
- Perceptions of management
- Lifestyle and satisfaction
- Community contribution and perception.

5.1. Perceptions of management

The charts below present aquaculture operators' perceptions of different aspects of aquaculture management and participation.

Figure 5-1 shows that most aquaculture operators feel that they understand the aquaculture management arrangements for their respective aquaculture sectors. Figure 5-2 shows variance in the perceptions of the quality of management from government agencies, with DAF having the most positive perception, and the Department of Environment and Science having the most negative perception. Figure 5-2 also shows that respondents are in general more positive about how well aquaculture businesses comply with rules and regulations than they are in the management and decision making for these regulations.

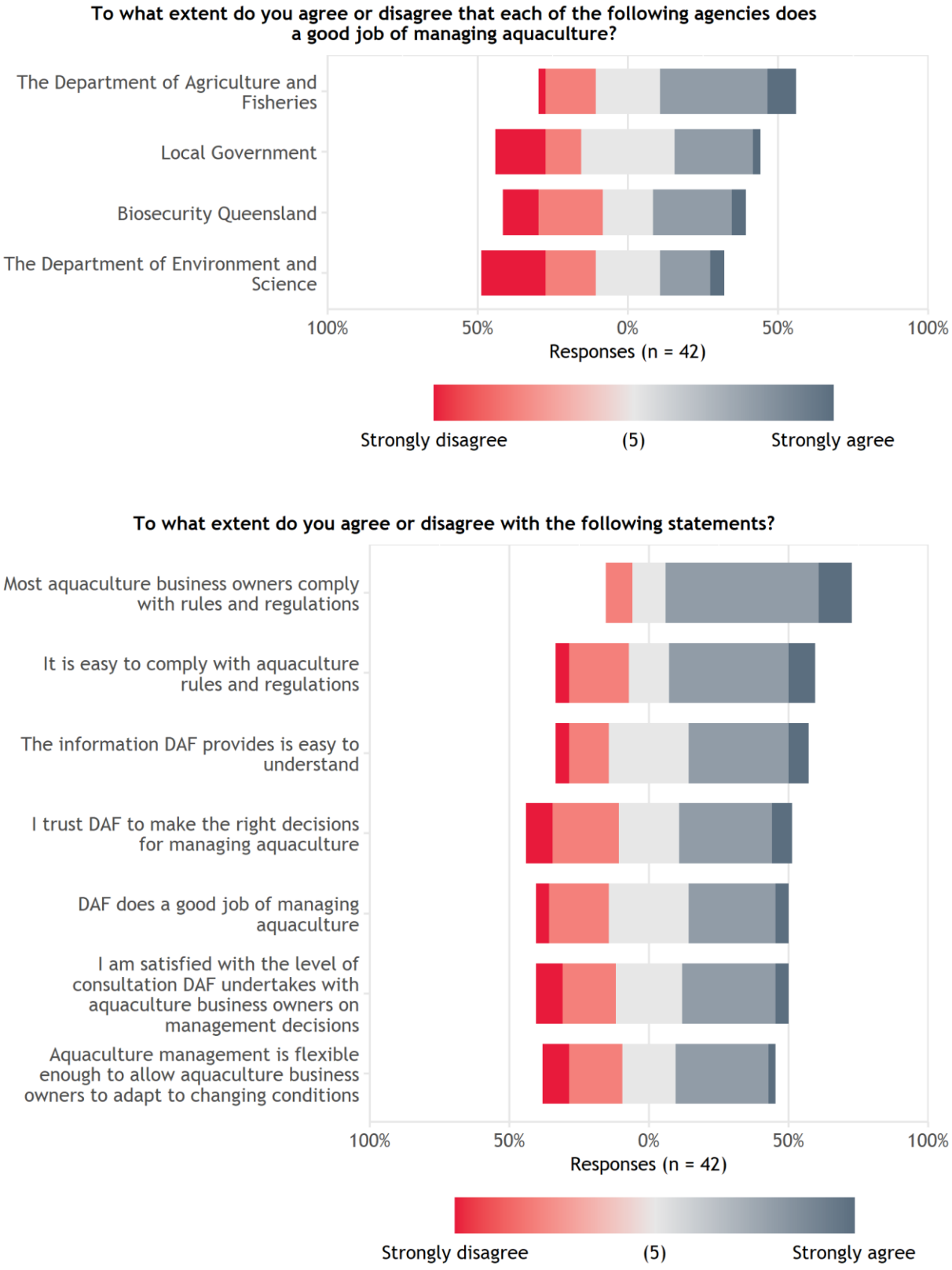
Figure 5-1 Perceptions of aquaculture management, 2021/22



[a] Total per cent of responses may not sum to 100 per cent as not all survey respondents answered all questions.

Source: BDO analysis

Figure 5-2 Perceptions of aquaculture management (cont.), 2021/22



[a] Total per cent of responses may not sum to 100 per cent as not all survey respondents answered all questions.

Source: BDO analysis

5.2. Lifestyle and satisfaction

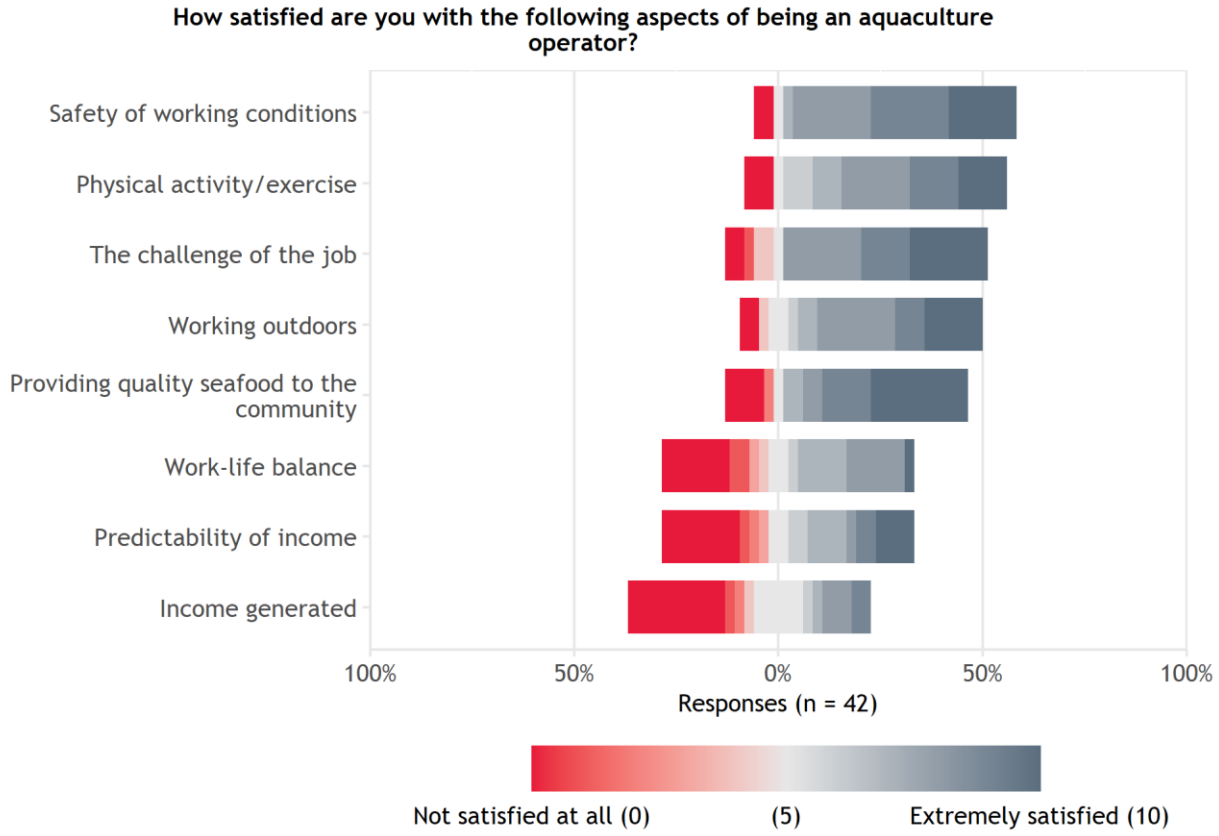
The charts below present indicators of lifestyle and satisfaction associated with being an aquaculture operator in Queensland.

Figure 5-3 shows general satisfaction of aquaculture operators relating to the lifestyle associated with the industry, with high satisfaction in safety, physical activity, challenge of the job and working outdoors. Unlike the satisfaction of the lifestyle the aquaculture industry provides, aquaculture operators are much less satisfied with their work life balance, predictability of income, and level of income generated.

Figure 5-4 shows the level of satisfaction with the infrastructure provided for aquaculture in Queensland. It shows that the largest level of satisfaction in infrastructure of aquaculture operators is with water drainage infrastructure, availability of feed, back-up facilities and water supply. The least satisfaction for aquaculture operators is related to access to land-based facilities and storage facilities.

Figure 5-5 shows that in general aquaculture operators plan to stay in the industry, with many respondents stating that they plan to stay in the industry for as long as possible. On the other end of the spectrum, no respondents stated that they plan to leave the industry as soon as possible.

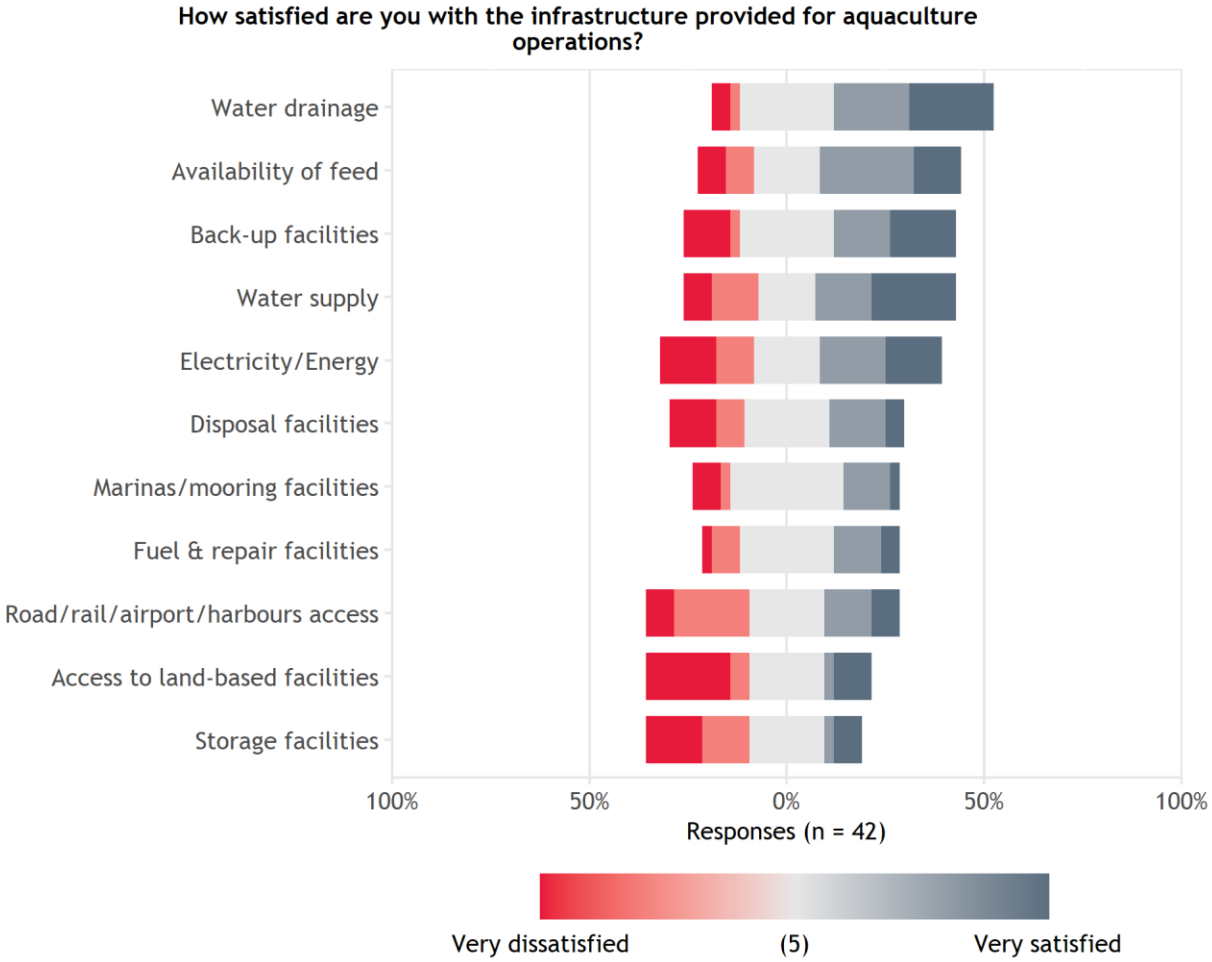
Figure 5-3 Lifestyle satisfaction, QLD aquaculture operators, 2021/22



[a] Total per cent of responses may not sum to 100 per cent as not all survey respondents answered all questions.

Source: BDO analysis

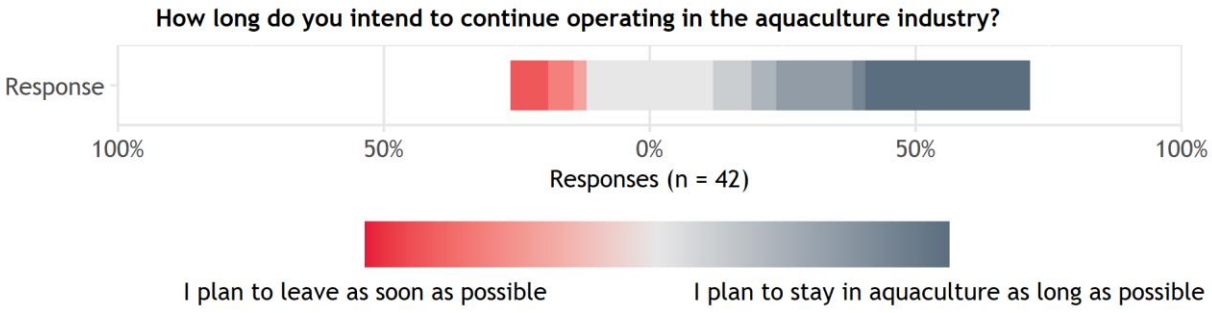
Figure 5-4 Infrastructure satisfaction, QLD aquaculture operators, 2021/22



[a] Total per cent of responses may not sum to 100 per cent as not all survey respondents answered all questions

Source: BDO analysis

Figure 5-5 Future in the aquaculture industry, QLD aquaculture operators, 2021/22



[a] Total per cent of responses may not sum to 100 per cent as not all survey respondents answered all questions.

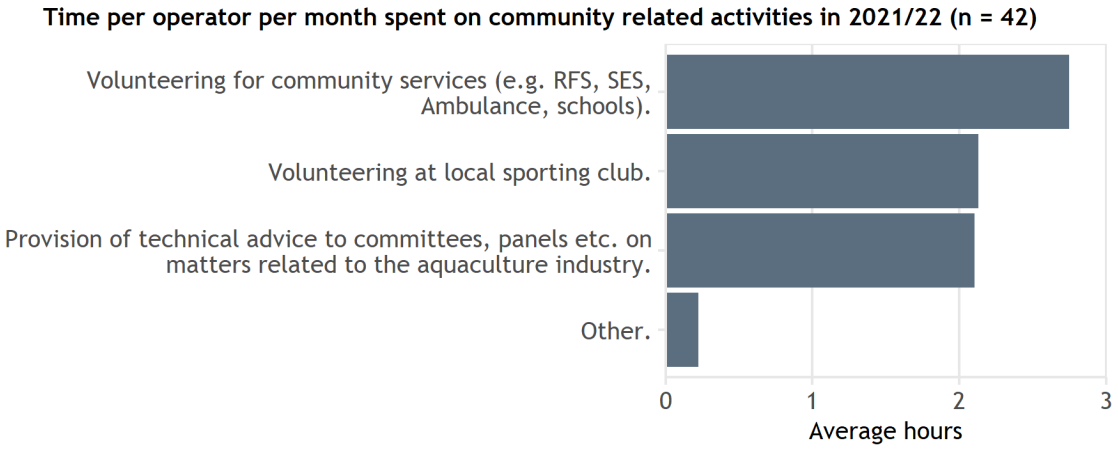
Source: BDO analysis

5.3. Community contribution and perception

The charts below present the community contributions of aquaculture operators, alongside how they believe the community perceives the aquaculture industry.

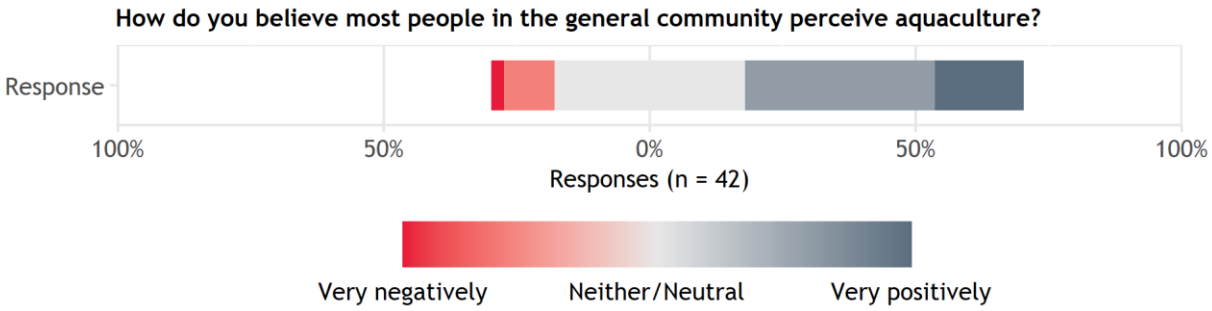
Figure 5-6 shows the contribution of Queensland aquaculture operators to their local communities. The most time operators spend on community contribution are volunteering across community services, followed by time spent volunteering at the local sporting clubs and time spent providing technical advice. Figure 5-7 shows that most aquaculture operators believe that the community perceives the aquaculture industry either positively, or very positively.

Figure 5-6 Community contribution in aquaculture, QLD, 2021/22



Source: BDO analysis

Figure 5-7 Community perception of the QLD aquaculture industry, 2021/22



[a] Total per cent of responses may not sum to 100 per cent as not all survey respondents answered all questions

Source: BDO analysis

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Disclaimer

The assignment is a consulting engagement as outlined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 17. Consulting engagements employ an assurance practitioner's technical skills, education, observations, experiences and knowledge of the consulting process. The consulting process is an analytical process that typically involves some combination of activities relating to: objective-setting, fact-finding, definition of problems or opportunities, evaluation of alternatives, development of recommendations including actions, communication of results, and sometimes implementation and follow-up.

The nature and scope of work has been determined by agreement between BDO and the Client. This consulting engagement does not meet the definition of an assurance engagement as defined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 10.

Except as otherwise noted in this report, we have not performed any testing on the information provided to confirm its completeness and accuracy. Accordingly, we do not express such an audit opinion and readers of the report should draw their own conclusions from the results of the review, based on the scope, agreed-upon procedures carried out and findings.

Appendix 1 Detailed economic contribution by species

Appendix Table 1-1 Prawn aquaculture economic contribution to QLD, 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	106.8	55.0	18.4	326	525
Processing	17.9	15.8	10.1	179	287
Total Direct	**124.6**	**70.8**	**28.4**	**505**	**813**
Flow-on effects					
Retail trade	9.0	4.9	3.8	61	75
Personal & other services	5.6	2.6	3.0	40	42
Professional, scientific & technical services	7.5	4.6	4.7	40	38
Health & community services	4.1	2.8	2.6	32	36
Road transport	5.6	2.6	2.1	25	21
Food & beverage services	3.0	1.4	1.2	24	33
Admin support services	6.1	3.8	3.9	23	26
Other food products	7.9	2.0	1.3	23	23
Wholesale trade	6.6	2.8	2.0	17	16
Education & training	2.2	1.5	1.5	17	19
Other sectors	63.7	31.0	9.0	111	105
Total Flow-on	**121.4**	**60.0**	**35.0**	**415**	**434**
Total	**246.0**	**130.7**	**63.4**	**920**	**1,247**
Total/Direct	*2.0*	*1.8*	*2.2*	*1.8*	*1.5*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-2 Prawn aquaculture economic contribution to QLD, 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	125.6	63.0	20.3	354	570
Processing	21.0	18.5	11.1	194	312
Total Direct	**146.6**	**81.5**	**31.4**	**548**	**883**
Flow-on effects					
Retail trade	10.4	5.6	4.4	71	86
Personal & other services	7.0	3.2	3.7	50	52
Professional, scientific & technical services	8.4	5.1	5.2	45	42
Health & community services	4.6	3.1	3.0	35	40
Other food products	10.4	2.7	1.6	30	31
Food & beverage services	3.4	1.5	1.4	27	37
Road transport	6.1	2.8	2.2	27	23
Admin support services	6.7	4.1	4.2	25	28
Wholesale trade	7.8	3.3	2.4	21	19
Education & training	2.5	1.7	1.7	19	21
Other Sectors	68.8	33.9	9.8	121	116
Total Flow-on	**136.0**	**67.2**	**39.6**	**471**	**494**
Total	**282.6**	**148.7**	**71.0**	**1,019**	**1,377**
Total/Direct	*1.9*	*1.8*	*2.3*	*1.9*	*1.6*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-3 Prawn aquaculture economic contribution to QLD, 2021/22[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	143.2	72.1	24.2	412	689
Processing	24.0	21.2	13.2	226	377
Total Direct	**167.1**	**93.3**	**37.4**	**638**	**1,065**
Flow-on effects					
Retail trade	12.2	6.6	5.1	82	100
Personal & other services	8.1	3.7	4.3	58	60
Professional, scientific & technical services	9.6	5.8	6.0	51	48
Health & community services	5.3	3.6	3.4	41	46
Other food products	12.2	3.1	1.9	35	36
Food & beverage services	4.0	1.8	1.6	31	43
Road transport	7.0	3.2	2.6	31	26
Admin support services	7.4	4.6	4.7	28	31
Wholesale trade	9.1	3.8	2.8	24	21
Education & training	2.9	2.0	2.0	22	24
Other Sectors	77.1	38.5	11.1	137	130
Total Flow-on	**154.8**	**76.8**	**45.4**	**540**	**567**
Total	**322.0**	**170.1**	**82.8**	**1,177**	**1,632**
Total/Direct	*1.9*	*1.8*	*2.2*	*1.8*	*1.5*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-4 Barramundi aquaculture economic contribution to QLD, 2019/20[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	26.9	6.2	5.2	92	124
Processing	1.2	0.6	0.5	9	12
Total Direct	**28.1**	**6.8**	**5.7**	**100**	**136**
Flow-on effects					
Retail trade	2.6	1.4	1.1	18	22
Personal & other services	1.9	0.9	1.0	14	14
Road transport	2.9	1.3	1.1	13	11
Professional, scientific & technical services	2.1	1.3	1.3	11	11
Other food products	3.0	0.8	0.5	9	9
Health & community services	1.0	0.7	0.7	8	9
Electricity supply	7.3	2.4	0.7	7	6
Food & beverage services	0.8	0.4	0.3	6	9
Wholesale trade	2.1	0.9	0.6	5	5
Education & training	0.6	0.4	0.4	4	5
Retail trade	14.3	7.7	2.8	31	30
Total Flow-on	**38.6**	**18.0**	**10.4**	**127**	**131**
Total	**66.7**	**24.8**	**16.1**	**228**	**267**
Total/Direct	*2.4*	*3.6*	*2.8*	*2.3*	*2.0*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-5 Barramundi aquaculture economic contribution to QLD, 2020/21[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	33.2	9.6	7.5	129	175
Processing	1.5	0.9	0.7	12	17
Total Direct	**34.7**	**10.5**	**8.2**	**142**	**192**
Flow-on effects					
Retail trade	3.3	1.8	1.4	22	27
Personal & other services	2.3	1.1	1.2	17	17
Professional, scientific & technical services	2.4	1.5	1.5	13	12
Road transport	2.8	1.3	1.0	13	11
Other food products	3.8	1.0	0.6	11	11
Health & community services	1.3	0.9	0.8	10	11
Food & beverage services	1.0	0.4	0.4	8	11
Electricity supply	6.9	2.2	0.6	7	6
Wholesale trade	2.5	1.1	0.8	7	6
Education & training	0.7	0.5	0.5	6	6
Other sectors	17.2	9.3	3.3	37	36
Total Flow-on	**44.3**	**21.0**	**12.2**	**149**	**155**
Total	**78.9**	**31.5**	**20.3**	**291**	**347**
Total/Direct	*2.3*	*3.0*	*2.5*	*2.1*	*1.8*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-6 Barramundi aquaculture economic contribution to QLD, 2021/22[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	44.0	16.2	9.7	164	156
Processing	2.0	1.4	0.9	16	15
Total Direct	**46.0**	**17.5**	**10.6**	**180**	**171**
Flow-on effects					
Retail trade	4.1	2.2	1.7	27	33
Personal & other services	2.8	1.3	1.5	20	21
Professional, scientific & technical services	2.9	1.8	1.8	16	15
Road transport	3.4	1.5	1.2	15	12
Other food products	4.6	1.2	0.7	13	14
Health & community services	1.6	1.1	1.1	13	14
Food & beverage services	1.2	0.5	0.5	10	13
Wholesale trade	3.1	1.3	0.9	8	7
Education & training	0.9	0.6	0.6	7	7
Electricity supply	6.9	2.2	0.6	7	6
Other sectors	20.9	11.3	4.0	44	43
Total Flow-on	**52.5**	**25.2**	**14.7**	**179**	**187**
Total	**98.5**	**42.7**	**25.3**	**359**	**358**
Total/Direct	*2.1*	*2.4*	*2.4*	*2.0*	*2.1*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-7 Freshwater fish aquaculture economic contribution to QLD, 2019/20[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	2.9	1.3	0.6	41	52
Processing	0.2	0.1	0.1	6	8
Total Direct	**3.1**	**1.5**	**0.7**	**47**	**60**
Flow-on effects					
Personal & other services	0.4	0.2	0.2	3	3
Retail trade	0.3	0.1	0.1	2	2
Professional, scientific & technical services	0.2	0.1	0.1	1	1
Health & community services	0.1	0.1	0.1	1	1
Road transport	0.2	0.1	0.1	1	1
Food & beverage services	0.1	0.0	0.0	1	1
Wholesale trade	0.2	0.1	0.1	0	0
Education & training	0.1	0.0	0.0	0	1
Electricity supply	0.5	0.2	0.0	0	0
Other food products	0.1	0.0	0.0	0	0
Other sectors	1.6	0.9	0.3	3	3
Total Flow-on	**3.7**	**1.8**	**1.1**	**13**	**14**
Total	**6.8**	**3.3**	**1.8**	**60**	**73**
Total/Direct	*2.2*	*2.3*	*2.5*	*1.3*	*1.2*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-8 Freshwater fish aquaculture economic contribution to QLD, 2020/21[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	3.0	1.5	0.5	30	38
Processing	0.2	0.1	0.1	4	6
Total Direct	**3.2**	**1.6**	**0.6**	**34**	**44**
Flow-on effects					
Personal & other services	0.3	0.2	0.2	2	3
Retail trade	0.2	0.1	0.1	2	2
Professional, scientific & technical services	0.2	0.1	0.1	1	1
Health & community services	0.1	0.1	0.1	1	1
Road transport	0.2	0.1	0.1	1	1
Food & beverage services	0.1	0.0	0.0	1	1
Wholesale trade	0.2	0.1	0.1	0	0
Electricity supply	0.5	0.1	0.0	0	0
Education & training	0.1	0.0	0.0	0	0
Other food products	0.1	0.0	0.0	0	0
Other sectors	1.5	0.8	0.3	3	3
Total Flow-on	**3.4**	**1.7**	**1.0**	**12**	**12**
Total	**6.6**	**3.3**	**1.5**	**46**	**56**
Total/Direct	*2.1*	*2.0*	*2.8*	*1.3*	*1.3*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-9 Freshwater fish aquaculture economic contribution to QLD, 2021/22[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	3.0	1.4	0.6	34	39
Processing	0.2	0.1	0.1	5	6
Total Direct	**3.2**	**1.5**	**0.6**	**39**	**45**
Flow-on effects					
Personal & other services	0.3	0.2	0.2	2	3
Retail trade	0.2	0.1	0.1	2	2
Professional, scientific & technical services	0.2	0.1	0.1	1	1
Health & community services	0.1	0.1	0.1	1	1
Road transport	0.2	0.1	0.1	1	1
Food & beverage services	0.1	0.0	0.0	1	1
Wholesale trade	0.2	0.1	0.1	0	0
Education & training	0.1	0.0	0.0	0	0
Other food products	0.2	0.0	0.0	0	0
Electricity supply	0.5	0.1	0.0	0	0
Other sectors	1.6	0.8	0.3	3	3
Total Flow-on	**3.6**	**1.8**	**1.0**	**12**	**13**
Total	**6.7**	**3.3**	**1.7**	**52**	**57**
Total/Direct	*2.1*	*2.1*	*2.6*	*1.3*	*1.3*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-10 Other species economic contribution to QLD, 2019/20[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	8.4	2.4	5.2	118	132
Processing	0.3	0.2	0.3	3	3
Total Direct	**8.7**	**2.6**	**5.5**	**121**	**135**
Flow-on effects					
Personal & other services	2.0	0.9	1.1	15	15
Retail trade	1.5	0.8	0.6	10	12
Professional, scientific & technical services	1.3	0.8	0.8	7	7
Health & community services	0.8	0.5	0.5	6	7
Admin support services	1.5	0.9	0.9	6	6
Food & beverage services	0.6	0.3	0.2	5	6
Education & training	0.4	0.3	0.3	3	4
Wholesale trade	1.0	0.4	0.3	3	2
Road transport	0.5	0.2	0.2	2	2
Electricity supply	2.0	0.6	0.2	2	2
Other sectors	9.3	4.9	1.4	18	18
Total Flow-on	**20.8**	**10.7**	**6.6**	**76**	**81**
Total	**29.5**	**13.3**	**12.1**	**197**	**216**
Total/Direct	*3.4*	*5.1*	*2.2*	*1.6*	*1.6*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-11 Other species economic contribution to QLD, 2020/21[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	8.4	2.5	5.3	119	143
Processing	0.3	0.2	0.3	3	3
Total Direct	**8.7**	**2.7**	**5.6**	**122**	**147**
Flow-on effects					
Personal & other services	1.9	0.9	1.0	14	14
Retail trade	1.5	0.8	0.6	10	12
Professional, scientific & technical services	1.3	0.8	0.8	7	7
Health & community services	0.8	0.5	0.5	6	7
Admin support services	1.5	0.9	1.0	6	6
Food & beverage services	0.6	0.3	0.2	5	6
Education & training	0.4	0.3	0.3	3	4
Wholesale trade	1.0	0.4	0.3	3	2
Road transport	0.5	0.2	0.2	2	2
Insurance & other financial services	0.8	0.4	0.2	2	4
Other sectors	10.4	5.2	1.4	18	16
Total Flow-on	**20.7**	**10.7**	**6.5**	**76**	**80**
Total	**29.4**	**13.4**	**12.2**	**198**	**227**
Total/Direct	*3.4*	*5.0*	*2.2*	*1.6*	*1.5*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 1-12 Other species economic contribution to QLD, 2021/22[a]

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	7.7	1.5	4.6	96	151
Processing	0.3	0.2	0.3	2	4
Total Direct	**7.9**	**1.7**	**4.9**	**98**	**155**
Flow-on effects					
Personal & other services	1.9	0.9	1.0	14	14
Retail trade	1.4	0.7	0.6	9	11
Professional, scientific & technical services	1.3	0.8	0.8	7	6
Admin support services	1.6	1.0	1.0	6	7
Health & community services	0.7	0.5	0.5	6	6
Food & beverage services	0.5	0.2	0.2	4	6
Education & training	0.4	0.3	0.3	3	3
Wholesale trade	0.9	0.4	0.3	2	2
Road transport	0.5	0.2	0.2	2	2
Electricity supply	1.9	0.6	0.2	2	2
Other sectors	8.9	4.7	1.4	18	17
Total Flow-on	**20.0**	**10.3**	**6.3**	**72**	**77**
Total	**27.9**	**12.0**	**11.2**	**171**	**231**
Total/Direct	*3.5*	*7.1*	*2.3*	*1.7*	*1.5*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix 2 Detailed economic contribution by region

Appendix Table 2-1 Aquaculture's economic contributions, QLD, 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	144.9	64.9	29.4	577	833
Processing	19.6	16.7	11.0	196	331
Total Direct	**164.5**	**81.6**	**40.4**	**773**	**1,164**
Flow-on effects					
Retail trade	13.4	7.2	5.6	91	111
Personal & other services	10.0	4.6	5.2	71	74
Professional, scientific & technical services	11.1	6.8	6.9	60	56
Health & community services	6.0	4.1	3.9	47	53
Road transport	9.3	4.2	3.4	42	35
Food & beverage services	4.5	2.0	1.8	36	49
Other food products	11.6	3.0	1.8	33	34
Admin support services	8.6	5.4	5.5	32	37
Wholesale trade	9.8	4.2	3.0	26	23
Education & training	3.3	2.3	2.2	25	28
Other sectors	97.1	46.9	13.6	168	159
Total Flow-on	**184.5**	**90.6**	**53.0**	**631**	**660**
Total	**349.0**	**172.2**	**93.4**	**1,404**	**1,824**
Total/Direct	*2.1*	*2.1*	*2.3*	*1.8*	*1.6*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-2 Aquaculture's economic contributions, QLD, 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	170.1	76.6	33.5	633	927
Processing	23.0	19.7	12.2	213	360
Total Direct	**193.1**	**96.3**	**45.7**	**846**	**1,287**
Flow-on effects					
Retail trade	15.4	8.3	6.5	104	128
Personal & other services	11.6	5.3	6.1	83	86
Professional, scientific & technical services	12.3	7.6	7.7	66	62
Health & community services	6.7	4.6	4.4	52	59
Road transport	9.6	4.4	3.5	43	36
Other food products	14.9	3.8	2.3	42	44
Food & beverage services	5.0	2.2	2.1	40	55
Admin support services	9.4	5.8	5.9	35	40
Wholesale trade	11.5	4.9	3.5	30	27
Education & training	3.7	2.6	2.5	28	31
Other sectors	104.3	51.1	14.8	183	174
Total Flow-on	**204.4**	**100.6**	**59.3**	**708**	**741**
Total	**397.5**	**196.9**	**105.0**	**1,554**	**2,028**
Total/Direct	*2.1*	*2.0*	*2.3*	*1.8*	*1.6*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-3 Aquaculture's economic contributions, QLD, 2021/22

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	197.9	91.3	38.9	706	1035
Processing	26.4	22.8	14.5	248	428
Total Direct	**224.3**	**114.1**	**53.5**	**955**	**1,462**
Flow-on effects					
Retail trade	17.8	9.6	7.5	120	147
Personal & other services	13.2	6.1	6.9	94	98
Professional, scientific & technical services	14.0	8.6	8.7	74	70
Health & community services	7.8	5.3	5.0	60	67
Other food products	17.5	4.5	2.8	50	51
Road transport	11.1	5.0	4.1	49	41
Food & beverage services	5.8	2.6	2.4	46	63
Admin support services	10.4	6.5	6.6	39	44
Wholesale trade	13.3	5.6	4.0	35	31
Education & training	4.2	3.0	2.9	32	36
Other sectors	115.7	57.3	16.6	204	194
Total Flow-on	**230.8**	**114.0**	**67.5**	**804**	**843**
Total	**455.1**	**228.1**	**120.9**	**1,759**	**2,305**
Total/Direct	*2.0*	*2.0*	*2.3*	*1.8*	*1.6*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-4 Aquaculture's economic contribution, SEQ, 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	13.9	6.9	3.0	56	83
Processing	2.0	1.7	1.2	24	35
Total Direct	**15.9**	**8.6**	**4.3**	**80**	**118**
Flow-on effects					
Retail trade	1.2	0.6	0.5	8	10
Personal & other services	1.0	0.5	0.5	7	8
Professional, scientific & technical services	1.1	0.7	0.7	6	5
Health & community services	0.5	0.3	0.3	4	4
Admin support services	0.8	0.5	0.5	3	3
Food & beverage services	0.4	0.2	0.1	3	4
Road transport	0.6	0.3	0.2	3	2
Education & training	0.3	0.2	0.2	2	3
Wholesale trade	0.8	0.3	0.3	2	2
Insurance & other financial services	0.8	0.4	0.2	2	2
Other sectors	6.5	3.2	0.8	10	10
Total Flow-on	**13.9**	**7.2**	**4.4**	**50**	**53**
Total	**29.8**	**15.7**	**8.7**	**130**	**171**
Total/Direct	*1.9*	*1.8*	*2.0*	*1.6*	*1.5*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-5 Aquaculture's economic contributions, SEQ, 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	18.4	8.9	3.8	70	104
Processing	2.7	2.3	1.5	29	44
Total Direct	**21.1**	**11.2**	**5.4**	**99**	**148**
Flow-on effects					
Retail trade	1.5	0.8	0.6	10	12
Personal & other services	1.3	0.6	0.7	9	10
Professional, scientific & technical services	1.3	0.8	0.8	7	7
Health & community services	0.6	0.4	0.4	5	6
Admin support services	1.0	0.6	0.6	4	4
Food & beverage services	0.5	0.2	0.2	4	5
Road transport	0.8	0.3	0.3	3	3
Wholesale trade	1.1	0.5	0.3	3	3
Education & training	0.4	0.3	0.3	3	3
Insurance & other financial services	1.0	0.5	0.2	2	2
Other sectors	7.9	3.9	1.0	13	12
Total Flow-on	**17.2**	**8.9**	**5.5**	**63**	**67**
Total	**38.3**	**20.1**	**10.9**	**162**	**215**
Total/Direct	*1.8*	*1.8*	*2.0*	*1.6*	*1.5*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-6 Aquaculture's economic contributions, SEQ, 2021/22

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	16.7	8.0	3.5	62	102
Processing	2.4	2.1	1.5	26	43
Total Direct	**19.1**	**10.1**	**4.9**	**88**	**145**
Flow-on effects					
Retail trade	1.4	0.7	0.6	9	11
Personal & other services	1.2	0.6	0.6	9	9
Professional, scientific & technical services	1.2	0.8	0.8	7	6
Health & community services	0.6	0.4	0.4	5	5
Admin support services	0.9	0.6	0.6	3	4
Food & beverage services	0.4	0.2	0.2	3	5
Road transport	0.7	0.3	0.3	3	3
Wholesale trade	1.0	0.4	0.3	3	2
Education & training	0.3	0.2	0.2	3	3
Insurance & other financial services	0.9	0.4	0.2	2	2
Other sectors	7.0	3.5	0.9	11	11
Total Flow-on	**15.7**	**8.1**	**5.0**	**58**	**61**
Total	**34.8**	**18.2**	**10.0**	**145**	**206**
Total/Direct	*1.8*	*1.8*	*2.0*	*1.7*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-7 Aquaculture's economic contributions, Cairns, 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	46.5	19.8	9.0	177	261
Processing	4.1	3.2	3.0	43	63
Total Direct	**50.6**	**23.0**	**12.0**	**219**	**324**
Flow-on effects					
Personal & other services	3.0	1.4	1.5	21	20
Retail trade	2.3	1.3	1.0	16	20
Road transport	3.0	1.3	1.1	13	10
Health & community services	1.4	1.0	0.9	11	11
Professional, scientific & technical services	1.3	0.8	0.8	8	7
Electricity supply	7.6	2.5	0.7	8	7
Wholesale trade	2.5	1.1	0.7	7	5
Food & beverage services	0.7	0.3	0.3	6	8
Admin support services	1.2	0.8	0.8	5	5
Education & training	0.4	0.3	0.3	3	4
Other sectors	13.6	7.8	1.9	26	23
Total Flow-on	**37.2**	**18.4**	**10.0**	**123**	**121**
Total	**87.8**	**41.4**	**22.1**	**343**	**445**
Total/Direct	*1.7*	*1.8*	*1.8*	*1.6*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-8 Aquaculture's economic contributions, Cairns, 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	49.8	20.1	10.6	194	279
Processing	4.4	3.4	2.7	47	67
Total Direct	**54.2**	**23.5**	**13.3**	**240**	**347**
Flow-on effects					
Personal & other services	3.5	1.6	1.8	24	23
Retail trade	2.6	1.4	1.1	18	22
Road transport	2.9	1.3	1.1	13	10
Health & community services	1.5	1.0	0.9	12	12
Professional, scientific & technical services	1.4	0.8	0.8	8	7
Wholesale trade	2.8	1.2	0.8	7	6
Food & beverage services	7.2	2.3	0.6	7	6
Electricity supply	0.8	0.3	0.3	6	9
Admin support services	1.2	0.8	0.8	5	5
Education & training	0.5	0.3	0.3	4	1
Other sectors	14.6	8.4	2.0	27	27
Total Flow-on	**38.9**	**19.5**	**10.7**	**132**	**129**
Total	**93.1**	**43.0**	**24.0**	**372**	**476**
Total/Direct	*1.7*	*1.8*	*1.8*	*1.5*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-9 Aquaculture's economic contributions, Cairns, 2021/22

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	49.6	20.8	10.6	184	244
Processing	4.3	3.5	2.6	44	59
Total Direct	**54.0**	**24.3**	**13.2**	**229**	**303**
Flow-on effects					
Personal & other services	3.4	1.5	1.7	24	22
Retail trade	2.6	1.4	1.1	18	22
Road transport	2.9	1.3	1.1	13	10
Health & community services	1.5	1.0	0.9	11	12
Professional, scientific & technical services	1.3	0.8	0.8	8	7
Wholesale trade	2.8	1.2	0.8	7	6
Food & beverage services	0.7	0.3	0.3	6	9
Electricity supply	6.1	2.0	0.5	6	5
Admin support services	1.1	0.7	0.7	4	5
Education & training	0.5	0.3	0.3	4	4
Other sectors	14.1	8.1	2.0	26	23
Total Flow-on	**36.8**	**18.6**	**10.3**	**126**	**124**
Total	**90.8**	**42.9**	**23.4**	**355**	**427**
Total/Direct	*1.7*	*1.8*	*1.8*	*1.6*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-10 Aquaculture's economic contributions, MIW, 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	48.0	22.3	8.6	152	237
Processing	7.1	6.1	3.9	72	112
Total Direct	**55.1**	**28.4**	**12.6**	**224**	**350**
Flow-on effects					
Retail trade	2.6	1.4	1.1	18	21
Personal & other services	2.5	1.0	1.1	14	14
Road transport	2.6	1.2	0.9	11	9
Food & beverage services	1.0	0.4	0.4	8	10
Electricity supply	6.8	2.2	0.6	7	6
Wholesale trade	2.3	1.0	0.6	6	5
Admin support services	1.5	1.0	0.9	5	6
Health & community services	0.5	0.4	0.3	4	5
Professional, scientific & technical services	0.7	0.4	0.4	4	4
Beef cattle	0.4	0.3	0.1	2	2
Other sectors	11.1	6.6	1.5	18	17
Total Flow-on	**32.2**	**15.9**	**8.0**	**97**	**99**
Total	**87.3**	**44.3**	**20.5**	**321**	**449**
Total/Direct	*1.6*	*1.6*	*1.6*	*1.4*	*1.3*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-11 Aquaculture's economic contributions, MIW, 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	63.7	30.9	10.7	188	298
Processing	9.4	8.2	5.2	89	141
Total Direct	**73.2**	**39.1**	**15.9**	**278**	**439**
Flow-on effects					
Retail trade	3.4	1.8	1.4	23	27
Personal & other services	3.3	1.4	1.5	19	19
Road transport	2.8	1.3	0.9	11	10
Food & beverage services	1.2	0.5	0.5	9	13
Wholesale trade	3.0	1.3	0.8	7	6
Admin support services	1.9	1.2	1.1	7	7
Electricity supply	6.7	2.2	0.6	6	6
Health & community services	0.7	0.5	0.4	5	6
Professional, scientific & technical services	0.9	0.5	0.5	5	4
Beef cattle	0.6	0.3	0.1	3	1
Other sectors	13.6	8.1	1.8	22	23
Total Flow-on	**37.9**	**19.0**	**9.7**	**117**	**121**
Total	**111.0**	**58.1**	**25.5**	**395**	**561**
Total/Direct	*1.5*	*1.5*	*1.6*	*1.4*	*1.3*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-12 Aquaculture's economic contributions, MIW, 2021/22

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	101.3	49.3	17.8	303	482
Processing	15.0	13.1	8.4	144	228
Total Direct	**116.3**	**62.4**	**26.2**	**447**	**710**
Flow-on effects					
Retail trade	5.5	3.0	2.3	37	44
Personal & other services	5.3	2.2	2.4	30	30
Road transport	4.5	2.0	1.5	18	15
Food & beverage services	2.0	0.9	0.8	15	20
Wholesale trade	4.8	2.0	1.3	12	10
Admin support services	2.9	1.8	1.7	10	11
Electricity supply	9.2	3.0	0.8	9	8
Health & community services	1.1	0.8	0.7	8	9
Professional, scientific & technical services	1.4	0.8	0.9	7	7
Beef cattle	0.9	0.6	0.1	5	4
Other sectors	21.7	12.9	2.8	35	33
Total Flow-on	**59.3**	**30.0**	**15.3**	**186**	**193**
Total	**175.6**	**92.4**	**41.5**	**633**	**902**
Total/Direct	*1.5*	*1.5*	*1.6*	*1.4*	*1.3*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-13 Aquaculture's economic contributions, Townsville, 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	21.3	10.2	3.8	71	110
Processing	2.7	2.3	1.7	28	44
Total Direct	**24.0**	**12.5**	**5.5**	**99**	**154**
Flow-on effects					
Retail trade	1.6	0.8	0.6	10	13
Personal & other services	1.2	0.5	0.6	8	8
Health & community services	0.7	0.5	0.4	5	6
Road transport	1.2	0.6	0.4	5	4
Food & beverage services	0.6	0.3	0.2	5	6
Professional, scientific & technical services	0.7	0.4	0.4	4	3
Electricity supply	3.3	1.1	0.3	3	3
Wholesale trade	1.0	0.4	0.3	3	2
Education & training	0.3	0.2	0.2	2	2
Admin support services	0.5	0.3	0.3	2	2
Other sectors	6.6	3.7	0.9	11	11
Total Flow-on	**17.7**	**8.8**	**4.8**	**59**	**62**
Total	**41.7**	**21.3**	**10.3**	**157**	**216**
Total/Direct	*1.7*	*1.7*	*1.9*	*1.6*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-14 Aquaculture's economic contributions, Townsville, 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	24.7	11.4	4.3	77	119
Processing	3.1	2.7	1.8	30	47
Total Direct	**27.8**	**14.1**	**6.1**	**107**	**166**
Flow-on effects					
Retail trade	1.8	1.0	0.7	12	15
Personal & other services	1.4	0.6	0.7	10	10
Health & community services	0.8	0.5	0.5	6	7
Road transport	1.3	0.6	0.5	6	5
Food & beverage services	0.6	0.3	0.3	5	7
Professional, scientific & technical services	0.8	0.5	0.5	4	4
Electricity supply	3.2	1.0	0.3	3	3
Wholesale trade	1.1	0.5	0.3	3	3
Education & training	0.3	0.2	0.2	2	3
Admin support services	0.6	0.3	0.4	2	1
Other sectors	7.2	4.1	1.0	12	14
Total Flow-on	**19.2**	**9.7**	**5.3**	**65**	**69**
Total	**47.0**	**23.7**	**11.4**	**172**	**235**
Total/Direct	*1.7*	*1.7*	*1.9*	*1.6*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-15 Aquaculture's economic contributions, Townsville, 2021/22

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	17.2	8.0	3.1	54	80
Processing	2.2	1.9	1.2	21	32
Total Direct	**19.4**	**9.9**	**4.4**	**75**	**112**
Flow-on effects					
Retail trade	1.3	0.7	0.5	8	10
Personal & other services	1.0	0.4	0.5	7	7
Health & community services	0.6	0.4	0.3	4	5
Road transport	0.9	0.4	0.3	4	3
Food & beverage services	0.4	0.2	0.2	4	5
Professional, scientific & technical services	0.5	0.3	0.3	3	3
Wholesale trade	0.8	0.3	0.2	2	2
Electricity supply	1.9	0.6	0.2	2	2
Education & training	0.2	0.2	0.2	2	2
Admin support services	0.4	0.2	0.2	1	2
Other sectors	5.0	2.9	0.7	9	8
Total Flow-on	**13.1**	**6.7**	**3.7**	**45**	**48**
Total	**32.4**	**16.6**	**8.1**	**120**	**159**
Total/Direct	*1.7*	*1.7*	*1.8*	*1.6*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-16 Aquaculture's economic contributions, Wide Bay 2019/20

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	8.2	3.6	2.8	78	98
Processing	0.6	0.4	0.4	11	13
Total Direct	**8.8**	**4.0**	**3.2**	**89**	**111**
Flow-on effects					
Personal & other services	1.1	0.5	0.6	8	8
Retail trade	0.8	0.4	0.3	5	7
Health & community services	0.4	0.3	0.3	3	4
Food & beverage services	0.3	0.1	0.1	2	3
Admin support services	0.5	0.3	0.3	2	3
Road transport	0.5	0.2	0.2	2	2
Professional, scientific & technical services	0.3	0.2	0.2	2	2
Other food products	0.6	0.1	0.1	1	1
Electricity supply	1.2	0.4	0.1	1	1
Wholesale trade	0.4	0.2	0.1	1	1
Other sectors	4.1	2.4	0.6	9	8
Total Flow-on	**10.1**	**5.1**	**2.9**	**37**	**39**
Total	**18.9**	**9.1**	**6.1**	**126**	**150**
Total/Direct	*2.2*	*2.3*	*1.9*	*1.4*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-17 Aquaculture's economic contributions, Wide Bay 2020/21

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	6.5	2.8	2.3	59	75
Processing	0.5	0.3	0.3	8	10
Total Direct	**7.0**	**3.1**	**2.6**	**67**	**85**
Flow-on effects					
Personal & other services	0.9	0.4	0.5	7	7
Retail trade	0.6	0.3	0.3	4	5
Health & community services	0.3	0.2	0.2	3	3
Admin support services	0.5	0.3	0.3	2	2
Food & beverage services	0.2	0.1	0.1	2	3
Road transport	0.3	0.2	0.1	1	1
Professional, scientific & technical services	0.2	0.1	0.1	1	1
Other food products	0.5	0.1	0.1	1	1
Wholesale trade	0.3	0.1	0.1	1	1
Electricity supply	0.9	0.3	0.1	1	0
Other sectors	3.4	2.0	0.5	7	7
Total Flow-on	**8.2**	**4.2**	**2.4**	**30**	**32**
Total	**15.2**	**7.3**	**5.0**	**97**	**117**
Total/Direct	*2.2*	*2.3*	*1.9*	*1.5*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

Appendix Table 2-18 Aquaculture's economic contributions, Wide Bay 2021/22

Sector	Output ($m)	Gross State Product ($m)	Household Income ($m)	Employment (fte)	Employment (total)
Direct effects					
Farming	6.9	2.7	2.4	60	87
Processing	0.5	0.4	0.3	8	12
Total Direct	**7.3**	**3.0**	**2.7**	**69**	**99**
Flow-on effects					
Personal & other services	1.0	0.4	0.5	7	8
Retail trade	0.7	0.4	0.3	5	6
Health & community services	0.4	0.3	0.2	3	3
Admin support services	0.6	0.3	0.4	2	3
Food & beverage services	0.3	0.1	0.1	2	3
Road transport	0.4	0.2	0.1	2	1
Professional, scientific & technical services	0.3	0.2	0.2	1	1
Other food products	0.5	0.1	0.1	1	1
Wholesale trade	0.4	0.2	0.1	1	1
Electricity supply	0.9	0.3	0.1	1	1
Other sectors	3.6	2.1	0.5	8	7
Total Flow-on	**8.9**	**4.6**	**2.6**	**33**	**35**
Total	**16.3**	**7.6**	**5.3**	**102**	**134**
Total/Direct	*2.2*	*2.5*	*2.0*	*1.5*	*1.4*

[a] Totals may not sum due to rounding.

Source: BDO analysis

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