

# ECONOMIC CONTRIBUTION OF RECREATIONAL FISHING BY QUEENSLANDERS TO QUEENSLAND

## A Report for Fisheries Queensland

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## GLOSSARY

**Basic price:** the amount received by the producer/supplier from the purchaser for a good/service supplied. It is calculated as the purchaser's price less any tax payable, plus any subsidy receivable and less any margins (transport, wholesale trade) on the good/service supplied as a consequence of its production or sale. The value of imports are included in the basic price.

**Purchaser price:** the price paid by purchaser/receiver of a good or service. It includes the price received by the producer/supplier of the good/service, taxes less subsidies paid on the good/service and margins (e.g. transport, wholesale, etc.) paid to supply the good/service. The value of imports are included in the purchaser price.

**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. Employment is a key indicator of both economic activity and the welfare of households.

**Full-time equivalent (fte):** is a way to measure a worker's involvement in a project or industry activity. An fte of 1.0 means that the person is equivalent to a full-time worker, while an fte of 0.5 signals that the worker is only half-time. Typically, different scales are used to calibrate this number, depending on the type of industry and scope of the analysis, but the basic calculation is the total hours worked divided by average annual hours worked in full-time jobs. The reported indicators are calculated on the basis that 1.0 fte is equal to 37.5 hours worked per week.

**Gross state and regional product (GSP and GRP):** is a measure of the net contribution of an activity or industry to the state/regional economy. They are the state and regional equivalents of GDP at the national level. 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.

**Gross domestic product:** is the total market value of goods and services produced in Australia within a given period after deducting the cost of goods and services used up in the process of production, but before deducting allowances for the consumption of fixed capital. It is equivalent to gross national expenditure plus exports of goods and services less imports of goods and services.

**Household income:** is income earned by employees of businesses and owner-operators. This is a sub-component of GSP/GRP that describes how much of the GSP/GRP is passed directly to households so it is a useful indicator of the welfare of households.

### Components of economic contribution

The components of each contribution indicator are:

1. *Direct:* Activity of businesses that directly supply recreational fishers
2. *Flow-on:* The sum of Production Induced (2) and Consumption Induced (3)
  - *Production Induced:* Activity occurring in all industries as a result of the expenditures made by businesses represented in the 'direct' activity described above

- *Consumption Induced*: Activity occurring in all industries as a result of households spending incomes generated through ‘direct’ and ‘production induced’ activities

3. *Total*: The sum of Direct (1) and Flow-on Effects (2).

**Willingness to pay (WTP)**: the total amount that visitors are willing to pay to utilise a recreational site, including actual expenditures incurred to use a recreational site as captured through transactions made in the formal market and the additional amount they’d be willing to pay over and above actual expenditures. The WTP gives a measure of the total value of a recreational site.

**Consumer surplus (CS) value**: the additional non-monetary value of a recreational site to people that utilise it, can be thought of as the amount that visitors are willing to pay over and above the amount they actually pay to use a recreational site as captured through transactions made in the formal market. The consumer surplus is the component of the total value representing the value placed on recreational fishing above the actual expenditure incurred and measures the annual net benefit value to recreational fishers.

**Recreational fishing regions**: regions (and subregions) used by the Statewide Recreational Fishing Survey 2019-20 (SRFS19) to locate fishing trips (see Figure 4-3 for the recreational fishing regions map).

**Department of Agriculture and Fisheries (DAF) subregions**: The unit of geography used for the regional economic contribution analysis (see Figure 4-1 for a map of the DAF regions and subregions). This is consistent with the geography used in the analyses of previous Queensland commercial and charter fishing economic contribution studies (see, for example, BDO EconSearch 2020a and 2020b).

## ABBREVIATIONS

APH	Australian Parliament House
CS	Consumer surplus
GDP	Gross Domestic Product
GSP	Gross State Product
GRP	Gross Regional Product
QH	Queensland Health
SRFS	Statewide Recreational Fishing Survey
SFS	the Queensland Sustainable Fisheries Strategy
TCM	Travel cost method
WTP	Willingness to pay



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## EXECUTIVE SUMMARY

The Queensland Sustainable Fisheries Strategy (SFS) (2017-2027) sets out a reform plan to improve the management of Queensland’s fisheries. It includes a requirement to develop economic and social indicators to assist with monitoring the state of Queensland’s fisheries. Development of economic and social indicators will provide a basis for comparing the performance of different sectors, including the commercial, charter, Indigenous and recreational sectors.

The Department of Agriculture and Fisheries engaged BDO in October 2020 to develop and estimate economic indicators based on observational data for the 12 months between 29<sup>th</sup> April 2019 and 28<sup>th</sup> April 2020. The objectives of this report are:

1. To present estimates of the economic contribution to Queensland of recreational fishing by Queenslanders
2. To present estimates of the total annual value and the net benefit of recreational fishing to recreational fishers in Queensland’s nine major recreational fishing regions based on observed data on time and money spent travelling to fishing locations
3. To present an estimate of the impact of COVID-19 on the economic indicators during March and April 2020 and estimate these economic indicators for the 2 month period after removing the effect of Covid-19.
4. To present estimates of the recreational fishing sector to be able to be compared to other fishery sectors (e.g. commercial).

A summary of key economic indicators is presented in Table ES-1.

**Table ES-1 Summary of key economic indicators, 2019/20**

Indicator	2019/20
Total expenditure	\$627.6m
Gross state product (GSP)	\$333.7m
Household income	\$209.5m
Employment (direct + flow-on)	3,136 fte jobs
Total value (market and non-market) <sup>a</sup>	\$787.9m
Total consumer surplus value <sup>a</sup>	\$196.9m

a For nine recreational fishing regions with sufficient observational data representing 93 per cent of the statewide total recreational fishing expenditure in 2019/20

Source: BDO EconSearch analysis

This analysis primarily used expenditure data collected during the 2019/20 Statewide Recreational Fishing Survey (SRFS19), which studied recreational fishing activity in Queensland by Queensland residents.

### Economic contribution analysis

Recreational fishing by Queenslanders in Queensland generated an estimated \$333.7m in total Gross State Product (GSP) throughout the State’s economy (i.e. including direct and flow-on contributions), \$209.5m in total household income and 3,136 fte jobs.

Eight regions had sufficient data to be individually analysed. They comprised approximately 82 per cent of the economic contribution of recreational fishing by Queenslanders to the Queensland economy. The largest contributor was the South East region (38 per cent of total GSP share), followed by the Wide Bay Burnett and Dry Tropics regions (11 per cent and 9 per cent share of total GSP, respectively). These regions combined, comprised 57 per cent of the share of total GSP contribution.

During the COVID-19 period there was an estimated increase in the economic contribution by 0.4 per cent (\$1.5m total GSP). The region with the largest increase in economic contribution attributed to COVID-19 was the South East.

These contributions do not include the contribution to Queensland's economy by interstate and international visitors to the state who go recreational fishing. As mentioned earlier, the expenditure data from the 2019/20 Statewide Recreational Fishing Survey (SRFS19) captures fishing in Queensland by Queenslanders. Therefore the contribution made by visitors to Queensland will be additional to the estimates presented here.

#### *Limitations of the analysis*

The SRFS19 survey did not collect information on where expenditures were made and therefore assumptions were necessary to allocate expenditures to regions in Queensland and to imports to Queensland. Whilst the economic contribution estimates at the state level are reasonably accurate, the regional estimates should be treated as indicative.

#### **The annual value placed on recreational fishing by Queensland's recreational fishers**

The annual value attributed to recreational fishing by Queensland's recreational fishers was estimated using data on actual travel undertaken and the costs incurred in going fishing. The method applied to estimate the total value uses this observed desire to spend time and money travelling to fishing locations to estimate the total value of recreational fishing to recreational fishers.

The total value includes actual expenditures incurred to fish as captured through transactions made in the formal market and the additional amount they'd be willing to pay over and above actual expenditures. Consumer surplus is the component of the total value representing the value placed on recreational fishing above the actual expenditure incurred and measures the annual net benefit value to recreational fishers.

The aggregate annual value of recreational fishing in Queensland's major fishing regions was estimated as \$788m. After adjusting for the exclusion of the impact of COVID-19 this value reduced to \$782m, a reduction of less than one per cent. The consumer surplus, a measurement of the annual net benefit value to recreational fishers, was estimated as \$197m. The consumer surplus (CS) is the component of the total value representing the annual value placed on recreational fishing above the actual expenditure incurred. The total expenditure in Queensland's nine major recreational fishing regions in 2019/20 was estimated as \$591m, or 93 per cent of the aggregate statewide expenditure value of \$633 million.

Statewide, there was an increase in the frequency of trips during March and April 2020 which may be attributed to COVID-19. This resulted in a total value estimate that was \$6.1m, or one per cent greater over the 12 months than would be expected in a normal 12 months. However, this positive effect was not observed in all the recreational fishing regions that were analysed; some increased and some decreased.

## Key findings and recommendations

Recreational fishing in Queensland by Queenslanders makes a substantial economic contribution to the Queensland economy (an estimated \$337m in total GSP and 3,136 fte jobs throughout the economy in 2019/20).

The aggregate annual value of recreational fishing in Queensland's major fishing regions (which includes both recreational fishers' actual expenditures and their consumer surplus) was an estimated \$788m in 2019/20. To enable comprehensive estimation of total value and net benefit value estimates across all of Queensland's recreational fishing regions, future surveys, including the SRFs and the BRS should focus on extending the amount of resources allocated to data collection in marginal recreational fishing regions. Future data collection efforts should also focus on increasing the sample size to enable estimation of different groups of recreational fishers at a sub-regional level to improve the accuracy of travel cost models and, subsequently, consumer surplus estimates.

Overall, the effects of COVID-19 during March and April 2020 suggests a small, positive increase in recreational fishing activity resulting in an estimated 0.4 per cent increase in total GSP and an estimated 1 per cent increase in aggregate annual value of recreational fishing.

For future recreational fishing surveys, we recommend that the location of expenditure be captured to postcode level during the survey. This will significantly improve the precision of the data in terms of location of expenditure. This is could be more burdensome for survey respondents, however there are tested methods that aim to collect this information whilst minimising cognitive load on respondents.

## 1. INTRODUCTION

The Queensland Sustainable Fisheries Strategy (SFS) (2017-2027) sets out a reform plan with a number of actions to improve the management of Queensland's fisheries, including for Fisheries Queensland to develop and implement economic and social indicators to assist with monitoring the state of Queensland's fisheries including the recreational fishing sector. This information will help Fisheries Queensland, sectors accessing the fisheries resource (commercial, charter, Indigenous and recreational) and other stakeholders understand the economics of each fishery and allow comparisons between the sectors.

The Department of Agriculture and Fisheries, Queensland, engaged BDO in October 2020 to:

1. estimate the economic contribution to Queensland of recreational fishing by Queenslanders
2. estimate the total annual value and the net benefit of recreational fishing to recreational fishers in Queensland's nine major recreational fishing regions based on observed data on time and money spent travelling to fishing locations
3. investigate the impact of COVID-19 on the economic indicators during March and April 2020 and estimate these economic indicators for the 2 month period after removing the effect of Covid-19.
4. estimate the recreational fishing sector to be able to be compared to other fishery sectors (e.g. commercial).

Comparisons of the economic contributions of commercial fisheries and recreational fisheries (made as fishing-related expenditures generate direct and indirect economic effects) need to be made very cautiously. The two activities are fundamentally different and require different input-output modelling approaches, and comparison can only be made where estimates are comprehensive. For commercial fisheries this requires that estimates include backward and forward linked sectors (for example, boat building sectors, as well as seafood retail sectors). For recreational fisheries this requires that only expenditures that are directly attributable to fishing are included in the estimate.

An industry economic contribution analysis is a descriptive analysis that traces the gross economic activity of the industry as dollars of expenditure cycle through the economy. An economic contributions analysis will answer the question 'What is the contribution or importance of the industry to national, state and/or regional economies and communities?'. It is generally undertaken within a modelling framework such as a standard input-output model, with the purpose being to determine how much direct and indirect economic activity is associated with the industry. A contribution analysis may provide evidence of how relatively large a sector is in the existing economy and how much economic activity is being cycled through the economy by that industry (Watson et al. 2014).

The activity of recreational fishing involves tangible economic components of expenditure and jobs. As with other leisure activities and the recreational use of natural resources such as forests and landscapes it also has a non-market value to the users including recreational fishers. The total non-market value (hereafter, *total value*) of recreational fishing measures the total amount of money that recreational fishers are willing to pay to fish. The total value includes actual expenditures incurred to fish as captured through transactions made in the formal market and the additional amount they'd be willing to pay over and above actual expenditures. Consumer surplus is the component of the total value representing the value placed on recreational fishing above the actual expenditure incurred and measures the annual net benefit value to recreational fishers.

## 2. INDICATORS

We have identified a list of economic indicators consistent with Fisheries Queensland's requirements. The indicators are presented below in categories of economic contribution, consumer surplus and impact of COVID-19.

### 2.1. Economic Contribution

Economic contributions were presented in terms of the following indicators:

- **Expenditures:** expenditures by recreational fishers at businesses located within the regional economy.
- **Employment:** refers to the number of jobs expressed in full-time equivalents<sup>1</sup>. Employment is a key indicator of both economic activity and the welfare of households
- **Gross state and regional product (GSP and GRP):** is a measure of the net contribution of an activity or industry to the state and regional economy, respectively. It represents payments to the primary inputs of production (labour, capital and land) and is a state or regional level equivalent of gross domestic product (GDP)
- **Household Income:** is income earned by employees of businesses and owner-operators. This is a sub-component of GSP that describes how much of the GSP is passed directly to households so it is a useful indicator of the welfare of households.

The following components of each contribution indicator are presented:

1. **Direct:** activity of businesses that directly supply recreational fishers
2. **Flow-on:** the sum of production induced and consumption induced:
  - **Production induced:** activity occurring in all industries as a result of the expenditures made by businesses represented in the 'direct' activity described above
  - **Consumption induced:** activity occurring in all industries as a result of households spending incomes generated through 'direct' and 'production induced' activities
3. **Total:** the sum of Direct (1) and Flow-on effects (2).

Results are presented by direct, flow-on and total effects. The top 5 industries impacted by total GSP or GRP are also identified in the results. The above indicators, and their components, are consistent with those reported for previous Queensland commercial and charter fishing economic contribution studies (see, for example, BDO EconSearch 2020a and 2020b).

### 2.2. Total Value and consumer Surplus Value Estimation

The consumer surplus (CS) valuation exercise involved estimation of the following metrics for each of Queensland's major recreational fishing regions:

- The total annual value and CS value per recreational-fishing region

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<sup>1</sup> 1.0 fte is equal to 37.5 hours worked per week.

- The total annual value and CS value per household and per person, over and above the actual travel cost incurred
- The total value and CS value of recreational fishing per household and per person per trip and per day
- The average travel cost incurred per person per trip
- The average number of trips made by a fishing household
- The average number of days fished per trip.

The indicators were calculated for the 12 months from April 2019 to April 2020 for the SRFS19 for nine recreational fishing regions with sufficient observational data representing 93 per cent of the statewide total recreational fishing expenditure in 2019/20<sup>2</sup>.

### **2.3. Impact of COVID-19**

The estimates for all the economic indicators calculated from the raw data include any impact on recreational fishing and spending behaviour due to responses to COVID-19. To understand the potential impact of COVID-19 on these indicators, the initial estimates were adjusted for probable changes in the frequency of fishing trips in each fishing region in March and April 2020 to provide annual estimates representing a 'typical' year.

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<sup>2</sup> Recreational fishing regions with a minimum sample size of 40, which were regions y, x, r, l, k, g, j, q and v (see Figure 4-3 for location of regions).

## 3. DATA

Fisheries Queensland provided data from the Statewide Recreational Fishing Survey from 2019-20 (SRFS19) and the Boat Ramp Survey (BRS) from 2016 to 2020. In addition, stakeholder interviews were conducted to consider anecdotal perspectives of the impact of COVID-19 on recreational fishing in Queensland. Each dataset is outlined in this section.

### 3.1. Statewide Recreational Fishing Surveys

SRFS19 provides data based on diary entries for each fishing trip of participating recreational fishers in each fishing region and subregion from April 2019 to April 2020. The data collected includes the water body type, platform (i.e. boat or shore), fishing method, target species, main reason for trip, amount of time spent fishing, whether fishers kept or released their catch, number of fish caught, fishers' place of residence, and trip and off-trip costs incurred.

SRFS19 also provides data from a household 'exit' survey, which included data on yearly or non-trip related costs (i.e. off-trip) to support recreational fishing activities. These costs include expenditure on fishing equipment, fishing vessels, vessel maintenance, mooring, registration, insurance, safety gear (vessel and personal), membership fees, books/magazines and clothing.

### 3.2. Boat Ramp Survey

The Boat Ramp Survey (BRS) dataset contains information on daily observations of trailer counts between 2016 and 2020 at boat ramps useful for monitoring changes in fishing activities and calculating indices which can be monitored through time. The BRS dataset was used to quantify the change in the frequency of fishing trips between March and April in 2017, 2018 and 2019 and March and April 2020 that could be attributed to COVID-19 taking inter-annual variations into account.

### 3.3. Background Research and Consultation

Industry consultation and background research was undertaken to understand the impact of COVID-19 using semi-structured interviews with various recreational fishing associations and organisations, including:

- Mackay Recreational Fishers Alliance
- Fraser Coast Fishing Alliance
- Queensland Recreational Fishing Network
- Australian Fishing Trade Association
- Australian National Sportfishing Association Queensland
- SUNFISH Queensland
- Queensland Amateur Fishing Clubs Association
- Queensland Game Fishing Association
- CAREFISH
- Blue Fin Fishing Club





The interviews were structured to elicit perceptions on how boat-based and shore-based recreational fishing was impacted by COVID-19 in March and April 2020.

## 4. METHODOLOGY

This section provides a description of analytical methods used to estimate economic contribution and consumer surplus values of recreational fishing by Queenslanders to Queensland's regions.

Our analysis consisted of three key components:

- Economic contribution analysis
- Consumer surplus valuation using Travel Cost Method (TCM)
- Estimating the impact of COVID-19.

### 4.1. Economic Contribution Analysis

#### 4.1.1. Expenditure

The first step in calculating economic contribution was to develop expenditure estimates for the recreational fishing population in Queensland. Expenditure is a measure of how much recreational fishers spend on fishing trips and on equipment, memberships, etc., to support their fishing at other times of the year (i.e. off-trip expenditures). Trip and off-trip expenditure from the Statewide Recreational Fishing Survey 2019-20 (SRFS2019) were used and were aggregated from the survey sample to the population of recreational fishers in Queensland using the individual response weights developed by SRFS2019.

These aggregated expenditure data were then converted from purchasers' prices to basic prices by reallocating estimates of net taxes, retail and transport margins.

The final adjustment to the aggregate expenditure data was allocating them to the relevant input-output sectors (78 intermediate sectors, other value added and imports) in which the expenditure occurred, compiling a final demand profile ready for input into the economic contribution estimation models.

#### 4.1.2. Estimation of expenditure

The first step in estimating economic contribution was to estimate recreational fishing expenditure. To estimate total annual expenditure by location from the survey, the following data processing steps were undertaken:

1. Data adjustment
2. Scaling the expenditure from the survey sample to the population
3. Allocating the expenditure to regions.

##### *Step 1 - data adjustment*

During the SRFS19 some respondents could not recall their expenditure. Where respondents could not recall their expenditure a value of zero was used, consistent with the approach used by the SRFS2019.

Off-trip vessel-related expenditures were adjusted by the proportion of time the vessel was used for recreational fishing, based on responses given to the relevant exit survey question. For example, if the proportion of time the vessel was used for recreational fishing was 50 per cent then vessel related costs were halved.

### *Step 2 - scaling the expenditure from the survey sample to the population*

As part of the survey analysis, undertaken by the Social Research Centre on behalf of Fisheries Queensland, weights were derived per response and used to scale up expenditure for each response from the survey sample to the population. The methods used to estimate these weights are described in SRC (2020).

### *Step 3 - allocating expenditures to regions*

Information was not collected in the survey on where expenditures were made and therefore assumptions had to be applied to the location of the expenditure to allocate expenditures to the regions (DAF subregions, see Figure 4-1). The following assumptions for location of expenditure were made:

Trip expenditure:

- 100 per cent trip destination: accommodation, boat hire and charter fees.
- 50:50 trip destination to home location: bait, tackle and ice; car fuel and boat fuel.

Off-trip expenditure: all expenditures were assumed to be made at the home location.

Concordances were used to allocate home locations and fishing trip destination to DAF subregions<sup>3</sup> (see Appendix Table 3-1 and Appendix Table 3-2).

#### **4.1.3. Geography used for the analysis**

The unit of geography used for the regional economic contribution analysis was the DAF subregions (Figure 4-1). This is consistent with the geography used in the analyses of previous Queensland commercial and charter fishing economic contribution studies (see, for example, BDO EconSearch 2020a and 2020b).

#### **4.1.4. Fisher categories used for the analysis**

Data in the fishing diary survey was collected on waterbody type and platform type. Analysis of the trip expenditure results indicated the following activity groupings best described the data: Offshore, coastal boat-based, coastal shore-based, inland boat-based and inland shore-based (see Appendix Table 3-3 for details of activity grouping by waterbody type and platform type).

#### **4.1.5. Final demand profile**

In economic modelling terms, expenditure by fishers is referred to as final demand. When the expenditure is disaggregated by industry sector (retail, restaurants, accommodation, etc.) and converted from ‘purchasers’ prices<sup>4</sup>, into ‘basic prices<sup>5</sup>’ it is referred to as a final demand profile.

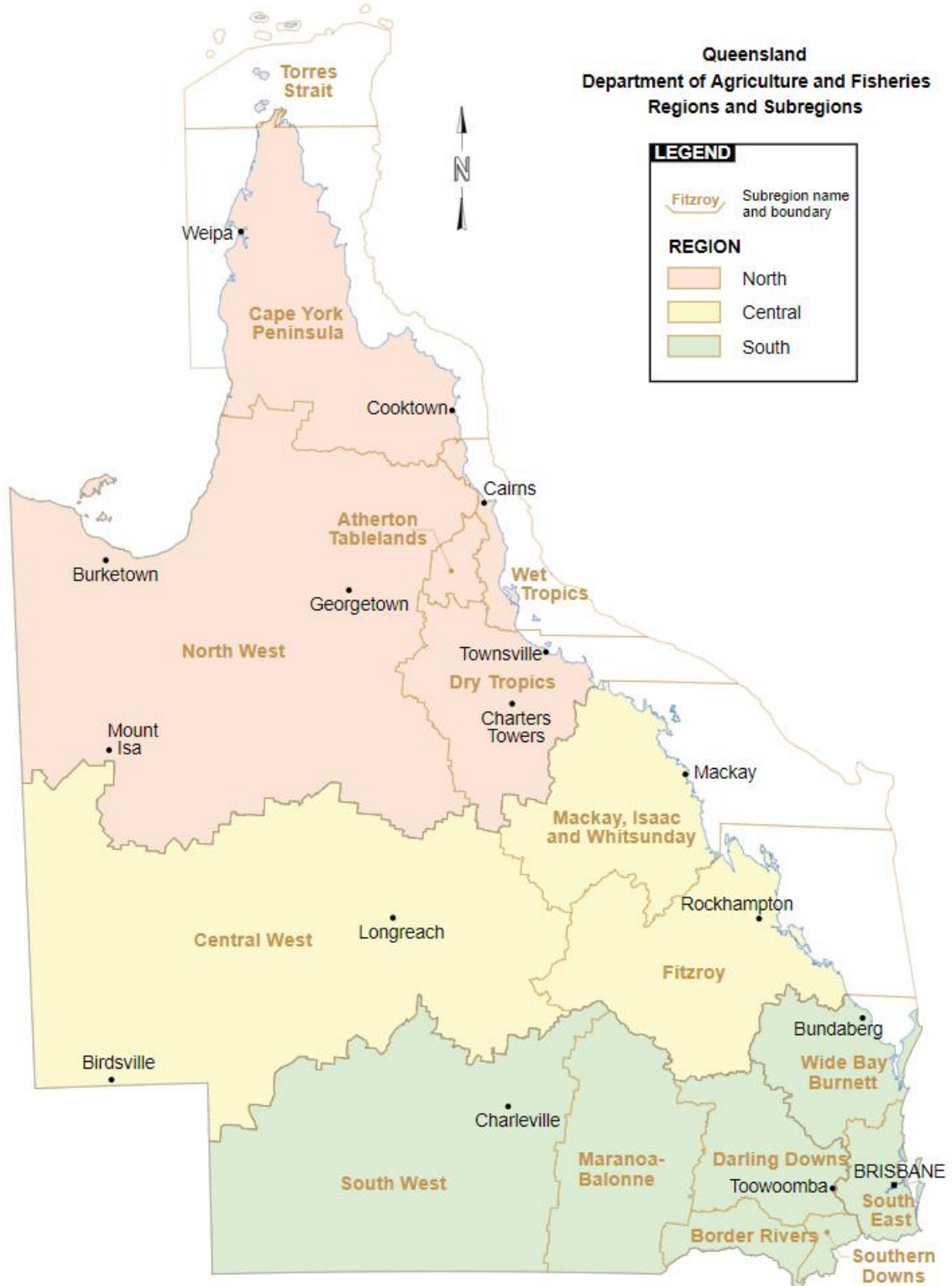
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<sup>3</sup> See Figure 4-1 for a map of DAF regions and subregions.

<sup>4</sup> The price paid by purchaser/receiver of a good or service. It includes the price received by the producer/supplier of the good/service, taxes less subsidies paid on the good/service and margins (e.g. transport, wholesale, etc.) paid to supply the good/service.

<sup>5</sup> The amount received by the producer/supplier from the purchaser for a good/service supplied. It is calculated as the purchaser’s price less any tax payable, plus any subsidy receivable and less any margins (transport, wholesale trade) on the good/service supplied as a consequence of its production or sale.

Figure 4-1 Department of Agriculture and Fisheries (DAF) regions and subregions



Source: Queensland Government 2020

The conversion of expenditure estimates from purchasers (i.e. what fishers pay) to basic prices (i.e. what producers, service providers and other businesses receive) was as follows.

Net taxes (taxes minus subsidies) and retail and transport margins were reallocated to make the data consistent with accounting conventions used in the Regional Industry Structure and Employment (RISE) model (see Section 4.1.6). Purchasers to basic price ratios were derived from ABS data (ABS 2013, Table 9). This process ensured that margins, such as retail and transport margins, were allocated to the appropriate sectors and taxes were properly identified.

The final adjustment to the base data was allocation of expenditure data in basic prices to the relevant input-output sectors (78 intermediate sectors, other value added and imports<sup>6</sup>) in which the expenditure occurred, thus compiling a profile of sales to final demand. This process was undertaken for each fisher category (offshore, coastal boat-based, coastal shore-based, inland boat based and inland shore based) and the results aggregated to form a single final demand profile by fishery region and Queensland.

#### 4.1.6. Economic contribution analysis

Economic contribution analysis is a way of measuring the contribution that recreational fishing makes to regional and state economies.

Contribution analysis is a descriptive analysis that traces the gross economic activity arising out of recreational fishing activities as dollars of expenditure cycle 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 to estimate indicators such as gross regional product and employment. 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 recreational fishing activity. This is because the contribution of the fishery extends beyond the initial round of output, income and employment generated by the recreational fishing expenditures. These indirect or flow-on effects are part of the contribution of recreational fishing activity to the economy and are added to the direct effects in order to get a full appreciation of the economic contribution of recreational fishing. This method was recommended by the National Fisheries and Aquaculture Industry Contributions Study (FRDC project 2017-210) (BDO EconSearch 2019).

The estimates of economic contribution presented in this report are generated by an extension of the conventional input-output (I-O) method known as the RISE model (Regional Industry Structure and Employment) developed by BDO EconSearch. The economic contribution analysis method and models are consistent with those used in the analyses of previous Queensland commercial and charter fishing economic contribution studies (see, for example, BDO EconSearch 2020a and 2020b).

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<sup>6</sup> On an item-by-item basis, the expenditures were allocated between those occurring in the region, those occurring elsewhere in Queensland and those goods and services imported from outside the state.

## The RISE economic model

The RISE model of the state and regional economies has the I-O model as its core. I-O models are widely used to assess the economic contribution or impact, including employment and gross regional product, of various economic activities and policies.

To estimate regional economic contribution, the RISE model requires information on the magnitude of various expenditures and where they occur, in this case, gathered from the SRFS19 survey. Information is also needed on how the sectors receiving this expenditure share their expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds.

Survey data were used to determine the direct expenditures only. For expenditure in subsequent rounds a set of assumptions based on average inter-sector<sup>7</sup> expenditure were used. For example, if households in the regional economy spent 13 per cent of their income on food on average, it was assumed that, for instance, those households working in accommodation establishments that serve fishers did likewise.

The RISE model provides industry multipliers (in terms of employment, gross regional product (GRP) and household income), which are applied directly to expenditure estimates to formulate contribution estimates. This approach makes simplified assumptions about the operation of the economy but has the benefit of being relatively simple and transparent.

## Economic contribution indicators

Economic contribution is presented in terms of the indicators:

**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. Employment is a key indicator of both economic activity and the welfare of households.

**Gross state and regional product (GSP and GRP):** is a measure of the net contribution of an activity or industry to the state/regional economy. They are the state and regional equivalents of GDP at the national level. 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.

**Household income:** is income earned by employees of businesses and owner-operators. This is a sub-component of GSP/GRP that describes how much of the GSP/GRP is passed directly to households so it is a useful indicator of the welfare of households.

The components of each contribution indicator are:

4. *Direct:* Activity of businesses that directly supply recreational fishers
5. *Flow-on:* The sum of Production Induced (2) and Consumption Induced (3)

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<sup>7</sup> For a detailed account of the data used to develop the RISE models, see BDO EconSearch 2020c.

- *Production Induced:* Activity occurring in all industries as a result of the expenditures made by businesses represented in the ‘direct’ activity described above
- *Consumption Induced:* Activity occurring in all industries as a result of households spending incomes generated through ‘direct’ and ‘production induced’ activities

6. *Total:* The sum of Direct (1) and Flow-on Effects (2).

Results are presented by direct, flow-on and total effects. The top 5 industries impacted by total GSP/GRP are also identified in the results.

## 4.2. Total Value and Consumer Surplus Value Estimation

### 4.2.1. Introduction

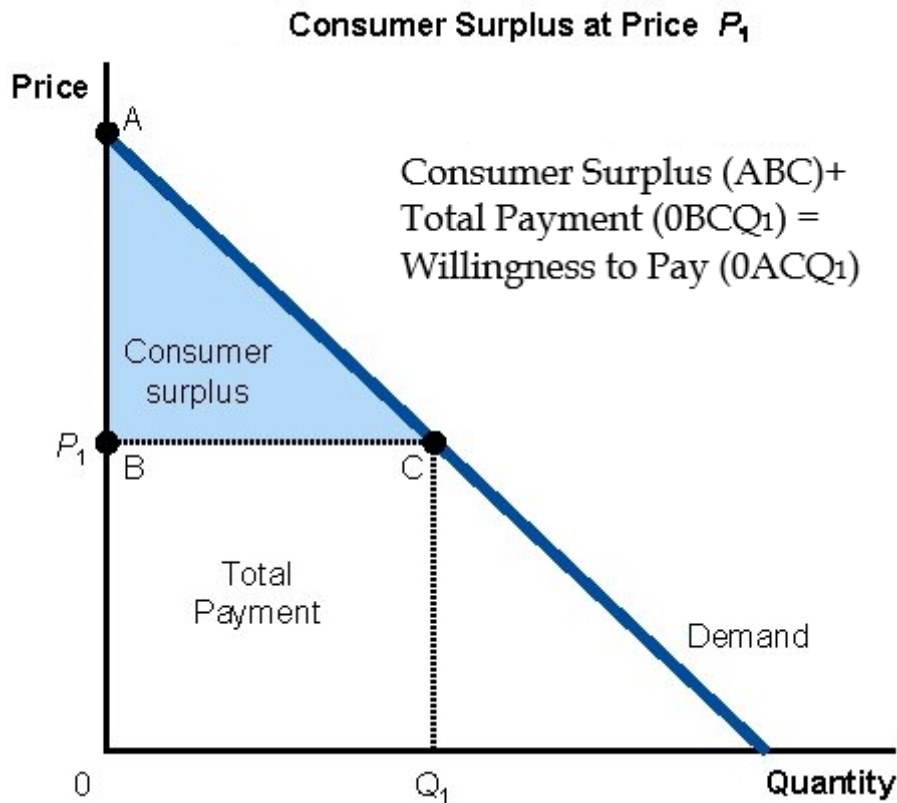
The objective of consumer surplus valuation using a travel cost method (TCM) is to estimate economic use values associated with ecosystems or sites that are used for recreation and as such do not have a direct market value. The value of a recreational site to the users of that site is not normally captured directly by the market. This is the case with Queensland’s recreational fishing sites. In Queensland, most recreational fishing sites do not require the payment of an access fee so there is no market price that can be directly used to understand the value of access to the users. However, users do incur other costs to access the site, specifically the costs of travel to the site and other indirect trip related costs.

The TCM aims to estimate the value of a recreational site to people that use the site in the absence of a readily available market price e.g. an access charge. The cost of travel is used as a proxy for price to value recreational sites and recreational activities. The TCM assumes that travel costs, including transportation, accommodation and fishing expenses can be used to approximate an implicit price associated with demand for the recreational site or activity.

Household-level data on the cost of travel per trip to a recreational site and the frequency of travel to the site can be used to estimate the functional relationship between the frequency of trips made to a site and travel costs incurred to visit the site. The rationale is that recreational fishers respond to changes in travel costs such that the number of trips to a recreational site of a given value decreases as travel costs increase. It assumes that people travel further to, or more often to, locations they consider to provide better recreational experiences or are more valuable to them.

Application of TCM involves estimation of a demand curve quantifying the relationship between travel costs and the frequency of trips made to a recreational site from which a consumer surplus value is calculated. The consumer surplus value measures the non-market benefit as the difference between what a visitor would be willing to pay to utilise a recreational site and what the visitor actually pays to utilise the recreational site. Specifically, the consumer surplus associated with utilising a recreational site is represented by the area under the demand curve and above the observed average travel cost per trip. Consumer surplus, or the additional non-monetary value of a recreational site to people that utilise it, can be thought of as the amount that visitors are willing to pay over and above the amount they actually pay to use a recreational site as captured through transactions made in the formal market (Figure 4-2).

Figure 4-2 A visual illustration of willingness to pay value, or total value, consumer surplus value and total expenditure



Source: BDO EconSearch analysis

We used the TCM to estimate the total value of fishing in Queensland's nine major recreational fishing regions representing 93 per cent of the statewide total recreational fishing expenditure in 2019/10.

The following sections describe three steps that were followed to estimate the consumer surplus value of recreational fishing in Queensland's major recreational fishing regions using TCM, including:

1. Preliminary summary statistical analysis,
2. Demand function estimation, and
3. Consumer surplus valuation.

#### 4.2.2. Preliminary summary statistical analysis

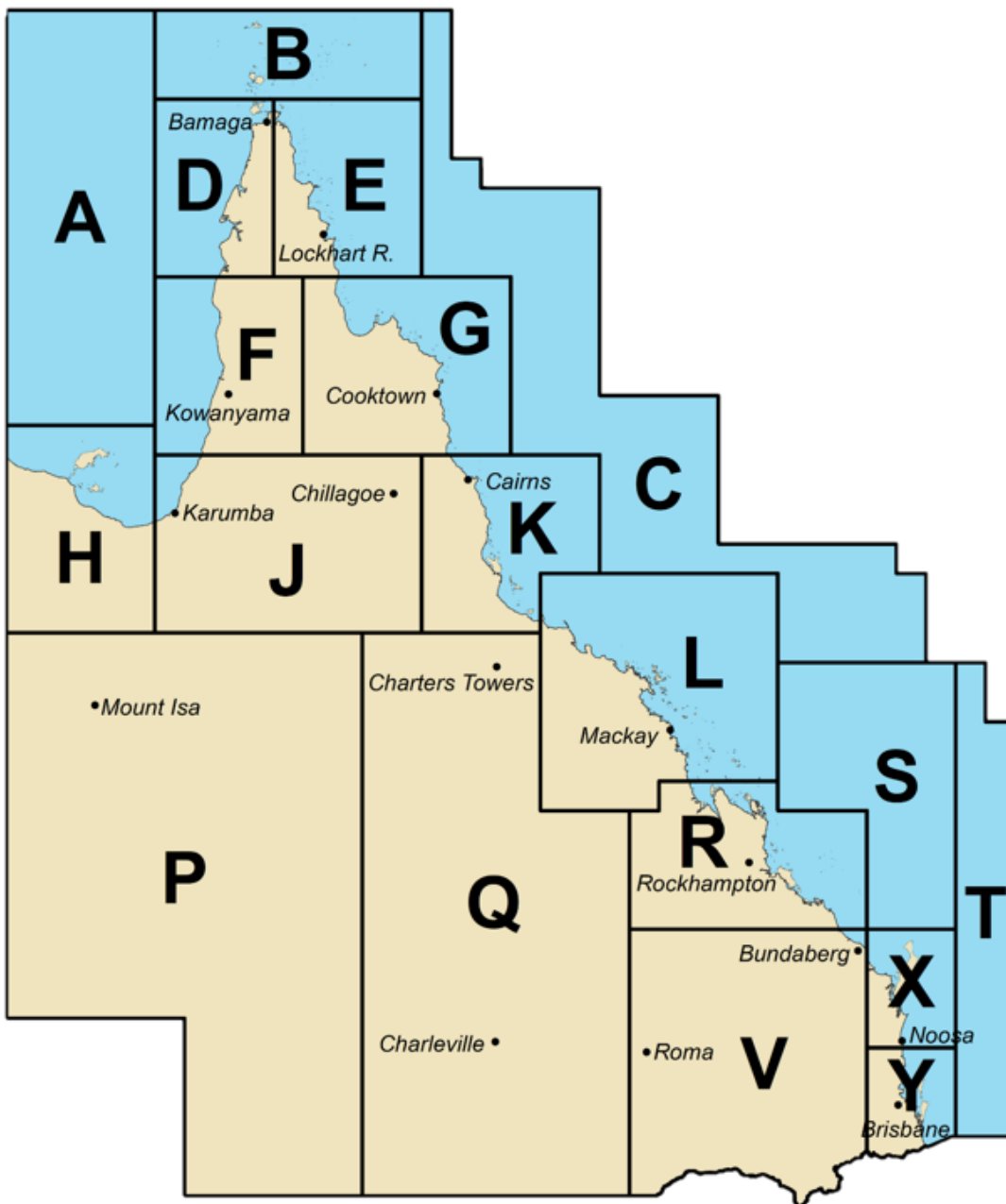
A preliminary summary statistical analysis was conducted to understand the distribution of the total and average number of fishing trips made to each recreational fishing region and the amount of money spent in each recreational fishing region. Estimates of the total number of trips and expenditure came from SRFS19. Specifically, the analysis was carried out to compare the average number of fishing trips made per fishing household and per person, the average travel cost incurred per fishing household and per person and regional aggregates for the total number of annual visits and expenditure.



### 4.2.3. Demand function estimation

We applied the TCM to estimate economic use values associated with Queensland’s nine major recreational fishing regions, including recreational fishing regions y, x, r, l, k, v, g, j, and q (Figure 4-4). The first stage in application of the travel cost model was to estimate the demand function, or the relationship between the frequency of visits to a recreational fishing region and travel costs incurred per visit.

Figure 4-3 Locations of the nine major recreational fishing regions for total values and the consumer surplus values were estimated



Source: The Social Research Centre 2020b

Estimation of the demand function involved regressing a number of independent household variables to explain the frequency of fishing trips made to each recreational fishing region, the dependent variable, taking differences in regional characteristics into account.

The most important independent variable of interest was the average travel cost per trip.

Travel costs were comprised of three main components:

4. Trip costs, including consumable items and materials (e.g. accommodation, car and boat fuel, bait, tackle, ice, boat hire and charter or guide fees,
5. Off-trip costs, including expenditure on capital equipment, boat or vessel, maintenance mooring, registration, insurance, safety gear, membership fees, books and clothing, and
6. The opportunity cost of time spent travelling to recreational fishing regions estimated as the value of time which could have been spent in alternative productive activities or recreational activities. Travel time was calculated by estimating distance travelled using car fuel costs incurred on a return fishing trip, average 2019 petrol and diesel prices, average fuel use efficiency, and average travel speed. The value of time was calculated at 50 per cent of the 2019/20 minimum wage.

The value of time spent fishing was not included in travel costs. The rationale is that whilst individuals get minimal utility from time spent on their journey to a recreational site and would realise greater utility from reallocating the journey time to the next best alternative income-generating or leisure activity, individuals get the highest utility from fishing time otherwise they would switch to the next preferred leisure activity meaning there is no net opportunity cost of time spent fishing (Borzykowski et al., 2017; Rolfe and Prayaga, 2007).

A common estimation issue with application of TCM is how to allocate travel costs across multiple recreational fishing regions visited by a household with limited observational data on expenditures apportioned by each recreational fishing region visited by the household. In the case of a household that visited multiple-regions, the proportion of travel costs assigned to each recreational fishing region was calculated as the weighted average of the total number of visits to each recreational fishing region visited by the household over the course of the SRFS19 12 month period.

Several functional forms for the demand function were tested, including simple and multiple semi-log dependent and independent functional forms, a functional form with regional fixed effects and with regional interaction effects. The multiple semi-log independent functional form with regional fixed effects was the preferred functional form for demand analysis because it takes into account unobserved time-invariant heterogeneity across recreational fishing regions when faced with a small number of regional observations and significant variation in regional characteristics.

Specifically, utilisation of a regional fixed effects model enabled consideration of differences in unobserved regional characteristics, for example, differences in compositions of:

1. Proximity to urban areas,
2. Distribution of water body types (e.g. in- and offshore marine waters, other marine waters, lake, freshwater river),
3. Proportion of fishing platforms (e.g. boat, charter boat, shore) and
4. Prevalence of different fishing methods (e.g. line, pot/trap, net, spearfishing).

The regional fixed effects model enabled regional differentiation with limited regional observational data for some of the smaller recreational fishing regions. Further, the multiple semi-log independent functional form with regional fixed effects had the highest R-Square value, or explanatory power for the strength of the relationship between the frequency of visits to a recreational fishing region and the travel cost incurred per visit.

#### 4.2.4. Estimation of consumer surplus values

A three-step process was followed to calculate the consumer surplus value of recreational fishing for each recreational fishing region:

1. In the first step, the demand function was integrated between zero and the average number of fishing trips made by a household to each recreational fishing region per year to obtain the total value,
2. Next, the total actual travel costs incurred by a household per year was calculated, and
3. In the final step, the consumer surplus value per household for each recreational fishing region was calculated as the difference between the total value per household and the total annual travel costs.

The aggregate consumer surplus value from recreational fishing in each recreational fishing region and average consumer surplus values in each recreational fishing region were scaled up from household-level estimates using regional aggregates and averages from the summary statistical analysis (Section 4.1.2).

Total values and consumer surplus value estimates for each of Queensland's nine major recreational fishing regions were aggregated to estimate the total value and the total consumer surplus value for the nine regions representing 93 per cent of the statewide total recreational fishing expenditure in 2019/10. Further, similar total value and consumer surplus valuation studies in Queensland and elsewhere were reviewed and results were discussed in context of findings from the reviewed studies.

### 4.3. Impact of COVID-19

The COVID-19 impact analysis included estimating the impact on each of the economic contribution indicators and consumer surplus values. This was primarily data-driven and based on an estimate of the counter-factual (without COVID-19) number of fishing trips taken and other measures of activity. The specific description of the 'without COVID-19' scenario was corroborated in consultation with tourism and recreational fishing contacts in Queensland's regions (see Section 3.3).

The effect on recreational fishing activity for the two month period of March-April 2020 was estimated as follows:

1. BRS datasets from 2017, 2018 and 2019 were analysed to calculate the profile of fishing trips and other measures of activity per month in each region
2. This profile was combined with the SRFS19 dataset to predict the counter-factual number of trips for March-April 2020 for a non-COVID-19 year for each region
3. This counter-factual number of trips for March-April 2020 was compared to the survey estimates of the same measures of activity to calculate the change in activity compared to a 'normal year'.

This estimated change in activity in March and April fed into separate analyses of economic impact and change in consumer surplus values for the full 12 month period of SRFS19 as described below.

### **Change in economic contribution of recreational fishing (economic impact)**

The estimated change in recreational fishing activity described above was used to adjust trip-expenditures. No adjustments were made to off-trip expenditures. The reasons are described in the remainder of this section.

Changes in economic activity cannot be estimated in the same way as static levels of economic activity (i.e. economic contribution) but the approach is similar. For example, when an employee loses their job, they often receive a substitute income such as an unemployment benefit or, in the case of COVID-19, special income support payments. This means that the individual continues to spend in the local economy and the consumption induced flow-on economic activity continues or reduces, rather than ceasing. The opposite is true for creating new jobs. For impact of COVID-19 stage of this analysis, the RISE economic models were reconfigured to compensate for this effect and other unemployment and population migration effects associated with changes in the level of expenditures in regional economies.

With the RISE models appropriately configured to model the economic impact of COVID-19, the change in expenditures were used to estimate indicators of economic impact as described for the economic contribution indicator method in Section 4.2.

### **Change in the total value of recreational fishing**

We used data on observed changes in trailer counts ‘with COVID-19’ and ‘without COVID-19’ to estimate the impact of COVID-19 on the frequency of trips and, consequently, on total value estimates for each recreational fishing region using historic time series BRS data between 2016 and 2020. Our analysis of the impact of COVID-19 using BRS data and survey data is contextualised using Fisheries Queensland’s analysis of April and May trailer count data.

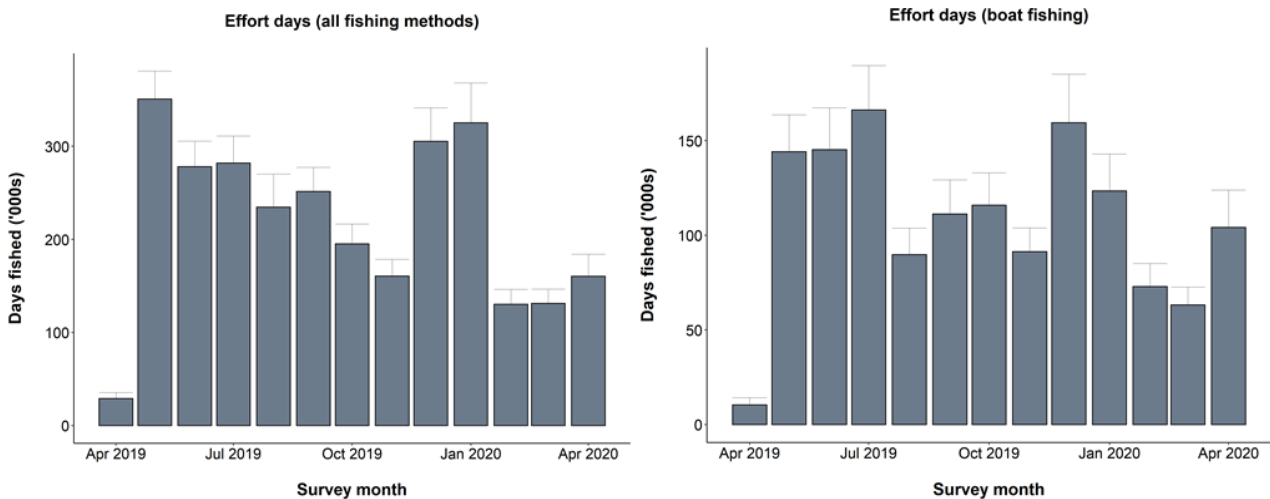
#### **4.3.1. Contextual background**

The first confirmed novel coronavirus case in Queensland was detected on 29 January 2020 and on 23 March 2020, the first Queensland lockdown was announced imposing lockdown measures and travel restrictions to prevent the spread of COVID-19. On 26 April 2020, the Queensland government lifted lockdown measures and Queensland residents were able to leave home for recreational activities (including recreational fishing) and could travel for a distance of up to 50km (APH, 2021; QH, 2021). After 15 May 2020, the travel radius for recreational activities was extended to 150km from place of residence to a recreational site for day trips.

Anecdotal evidence from various stakeholders suggested that the frequency of fishing trips in March and April 2020 in Queensland’s main recreational fishing regions was observed at up to three times the expected frequency for March and April following an increase in the number of people taking up recreational fishing due to restrictions on interstate and overseas travel. Fisheries Queensland’s analysis found that April and May 2020 trailer counts at nine boat ramps were the highest on record since the beginning of the BRS (Fisheries Queensland, 2020).

The primary data asset for estimating the annual value of the economic indicators, SRFS19, sampled households between April, 2019 and April, 2020 (Figure 4-4).

Figure 4-4 Total number (+SE) of households reporting fishing events by month (April 2019 represents 2 days, April 2020 represents 28 days)



Source: DAF Analysis of SRFS19

To estimate the annual value of recreational fishing in a 'typical' or representative 12 month period without COVID-19, adjustments were made to account for the impact period of COVID-19 on the frequency of visits, in particular, in March and April 2020.

The adjustment was based on the historical time series of Queensland's Boat Ramp Survey (BRS) data on trailer counts and information collected through structured stakeholder interviews. Specifically, the BRS trailer count time series data from 2016-20 was analysed. The analysis was contextualised using statements from a separate survey of various recreational fishing associations and organisations to understand stakeholder perceptions of changes in the frequency of fishing trips in March and April 2020 relative to previous years. The following stakeholders were interviewed:

- Mackay Recreational Fishers Alliance
- Fraser Coast Fishing Alliance
- Queensland Recreational Fishing Network
- Australian Fishing Trade Association
- Australian National Sportfishing Association Queensland
- SUNFISH Queensland
- Queensland Amateur Fishing Clubs Association
- Queensland Game Fishing Association
- CAREFISH
- Blue Fin Fishing Club.

### 4.3.2. Boat Ramp Survey data analysis

Observations of trailer counts for March and April 2020 were compared to observed historical trailer counts for March and April between 2016 and 2019 in each recreational fishing region using BRS time-series data. March 2020 trailer counts were higher than the average of March 2016-19 trailer counts for recreational fishing regions *y*, *x* and *l*. By contrast, regions *r*, *k* and *v* had lower trailer counts for March 2020 than the average of trailer counts observed in March 2016-19. April 2020 trailer counts were higher than the average of April 2016-19 trailer counts across all recreational fishing regions. The boat ramp survey program was progressively expanded into a statewide program through 2016 therefore data from 2016 was not used in the analysis.

Fisheries Queensland's analysis of the Boat Ramp Survey also found that there was variation in the impact of COVID-19 across the surveyed boat ramps with some ramps showing a statistically significant change in April and May 2020 trailer counts due to the COVID effect and other boat ramps showing no statistically significant change (Fisheries Queensland, 2020). We note that whilst Fisheries Queensland's own analysis of boat based recreational fishing activity during April and May of 2020 found a statistically significant 'COVID effect', the analysis also recognises that particularly favourable weather conditions during that period likely contributed to the increase in observed activity. Therefore the results presented here likely overestimate the increases in activity actually due to COVID-19.

### 4.3.3. Stakeholder interviews

Information elicited through interviews with various recreational fishing associations and organisations was used to contextualise findings from the BRS data analysis. Overall, information from interviews was consistent with observations from BRS time-series data that the frequency of trips in March and April 2020 was larger than what is typically expected in March and April in a typical year, due to COVID-19.

Statements collated from interview responses suggest recreational fishing was positively affected by COVID-19 in March and April 2020 (Appendix Table 1-1). Interview responses suggest that this may have occurred because there was an increase in the number of people taking up recreational fishing with up to two to three times the usual numbers of boats observed at boat ramps.

Interviewees also made statements suggesting that the impact of COVID-19 varied considerably across Queensland's major recreational fishing regions. Overall, recreational fishing regions that are typically frequented by fishers travelling an average distance of over 50-150km experienced a decline in the frequency of fishing trips and recreational fishing regions usually frequented by local fishers within a travel radius of less than 50-150km experienced a rise in the frequency of trips in March-April 2020.

Responses from the stakeholder interviews also suggested that COVID-19 affected the frequency of fishing trips made by occasional interstate and international recreational fishers due to cancellation of fishing competitions. Further, whilst organised recreational fishing activities were temporarily suspended, the general observation from interviewees is that local recreational fishers were still able to make local overnight trips individually within a travel radius of 50km in March 2020 and 150km in April 2020.

Statements from stakeholder interviews also suggest that restrictions on international and interstate travel led to a rise in expenditures on boats and other fishing equipment, in particular in May and June 2020, due to an increase in the number of new entrants with large disposable incomes. The increase in boat

expenditures due to COVID-19 was not included in this analysis because it is suggested to have occurred after April 2020.

We note that attributing the rise in boat expenditure in April 2020 to COVID-19 would likely overestimate the impact of COVID-19 on recreational fishing boat expenditures because good weather conditions in April 2020 also contributed to the rise in recreational fishing activity and, by extension, boat expenditures in April (Fisheries Queensland 2020). Further, it is difficult to estimate the proportion of additional boat sales in April 2020 that consisted of boats used for recreational fishing as opposed to commercial fishing or other boating activities.

#### 4.3.4. Adjusting for the impact of COVID-19

To adjust for the observed change in the frequency of visits in March and April 2020 relative to March and April in 2017, 2018 and 2019, observed frequencies of fishing trips for March and April 2020 in each recreational fishing region were adjusted using the inverse of the percentage change in observed trailer counts for March and April 2020 relative to the average for March and April in 2017, 2018 and 2019.

To take inter-annual variability in the frequency of fishing trips into account, the observed regional frequencies of trips for March and April 2020 were adjusted to equal the averages of historic frequencies in March and April in the three previous years with sufficient data (2017, 2018 and 2019). The adjustment enabled estimation of aggregate annual values of economic indicators in 2019/20 representing a 'typical' 12 month period without COVID-19.

Table 4-1 shows the value of multipliers that were used to adjust the observed frequency of aggregate annual regional trips in March and April 2020 to equal the average frequency for March and April in 2017, 2018 and 2019. For example, the total number of observed trailer counts reported for recreational fishing region  $r$  in March 2020 was 0.73 times the average of trailer counts observed in March in 2017, 2018 and 2019 in the recreational fishing region. To adjust for the decline in the frequency of trips for recreational fishing region  $r$  in March 2020, the observed number of trips to recreational fishing region  $r$  in March 2020 were adjusted using a multiplier of 1.37, or the inverse of 0.73, based on observed differences in March and April trailer counts in the recreational fishing region.

By contrast, trailer counts for April 2020 in recreational fishing region  $r$  were 3.16 times larger than the average trailer counts reported for April in 2017, 2018 and 2019. The number of trips to recreational fishing region  $r$  in April 2020 were thus adjusted using a multiplier of 0.32, or the inverse of 3.16.

Table 4-1 Adjusting for the impact of COVID-19 on frequency of fishing trips in March and April 2020

Region code <sup>a</sup>	March, 2020 COVID-19 Multiplier	April, 2020 COVID-19 Multiplier	Total observed trips (04/2019-04/2020)	Total trips (adjusted for COVID-19 impact in March)
y	0.79	0.70	556,563	537,783
x	0.48	0.95	125,284	122,724
r	1.37	0.32	94,544	92,316
l	0.92	0.27	131,024	123,881
k	1.21	0.25	158,853	153,989
v	1.16	0.44	83,174	81,340

a Insufficient observations for regions q, j and g (n<33)

Source: BRS 16-20 and SRF519

Statements collated from interviewee responses suggest that COVID-19 affected the frequency of both boat- and non-boat-based fishing trips to the same extent (Appendix Table 1-1). As such, we used observed changes in trailer counts as a basis for adjusting the frequency of trips made to each recreational fishing region, including for non-boat-based fishing.

Statements from stakeholder interviews also suggested that there was a rise in expenditures on boats and other fishing equipment due to COVID-19.



## 5. ECONOMIC CONTRIBUTION ANALYSIS RESULTS

Estimates of the economic contribution are presented for Queensland and by DAF sub-region (Figure 4-1) for the 2019/20 financial year. For each region, the contribution is presented as ‘with’ COVID-19 and ‘without’ COVID-19 scenarios. The ‘without’ scenario is more likely to represent a typical year.

The economic contribution of the cost of management was also analysed at the state level and is included in Section 5.1. Management costs relate to all recreational fishing activity in Queensland, not just that undertaken by Queenslanders, so the economic contribution of management activities attributable to Queenslanders is smaller than the amount estimated below.

### 5.1. Queensland

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Queensland economy in 2019/20 are outlined in Table 5-2. Table 5-3 presents the results with COVID 19 effects removed, and represents a more typical year. The economic cost of management results are included in Table 5-1.

Economic contribution is generated by recreational fishers’ expenditures both on fishing trips (on-trip) and on items and activities to support their recreational fishing (off-trip). The economic contribution of on-trip and off-trip expenditure are presented separately and combined in Table 5-2. On-trip contributions are further broken down into major fishing activity categories, namely offshore, coastal boat-based coastal shore-based, inland boat-based and inland shore-based fishing activity. Direct contribution measures the activity of businesses that directly supply goods and services to recreational fishers. The flow-on contributions measures the economic effects in other sectors of the economy (retail and wholesale trade, manufacturing, etc.) generated by direct activities, that is, the multiplier effects.

#### Contribution to GSP

As noted in Section 4.1.6, contribution to GSP is measured as value of output less the cost of goods and services (including imports) used in producing the output. For an estimated total expenditure on recreational fishing of \$627.60m, the total recreational fishing related contribution to GSP in Queensland was \$333.72m in 2019/20, with \$138.36m generated by recreational fishing directly and \$195.36m supported in other sectors of the state economy through flow-on effects (Table 5-2).

The top five most affected sectors in terms of total GSP were Other Machinery & Equipment (\$97.63m), Retail Trade (\$51.06m), Cultural & Recreational Services (\$43.27m), Road Transport (\$24.59m) and Public Administration & Regulatory Services (\$23.22m).

Removing the effect of COVID-19, the direct contribution to GSP was an estimated \$137.64m and including flow-on effects was an estimated total contribution to GSP of \$332.20m (Table 5-3).

The cost of managing recreational fishing contributed a further \$9.66m to total GSP, \$4.10m directly and \$5.57m in indirect effects (Table 5-1).

#### Household income

Direct contribution to household income of \$97.96m was estimated as a result of recreational fishing activity in 2019/20. A further \$111.57m of income was earned by wage earners in other businesses in Queensland

from the flow-on effects of recreational fishing spending. The estimated total household income contribution in Queensland was \$209.52m (Table 5-2).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$97.53m and including flow-on effects was an estimated total contribution to household income of \$208.65m (Table 5-3).

The cost of managing recreational fishing contributed a further \$6.72m to total household income, \$3.49m directly and \$3.23m in indirect effects (Table 5-1).

### Employment

Total recreational fishing related contribution to employment in Queensland was an estimated 3,135.7 fte jobs in 2019/20, with 1,549.0 fte jobs generated by recreational fishing directly and 1,586.7 fte jobs supported in other sectors of the state economy through flow-on effects (Table 5-2).

Removing the effect of COVID-19, the total contribution to employment in Queensland was 3,121.6 fte jobs with 1,541.0 fte jobs generated by recreational fishing directly and 1,580.6 fte jobs supported by flow-on effects (Table 5-3).

The cost of managing recreational fishing contributed a further 87.6 fte jobs to employment, 41.8 fte jobs directly and 45.8 fte jobs supported by flow-on effects (Table 5-1).

**Table 5-1 Economic contribution of cost of managing recreational fishing to Queensland, 2019/20**

	Expenditure (\$m)	GSP (\$m)	Household income (\$m)	Employment (fte jobs)
Direct effects	6.54	4.10	3.49	41.8
Flow-on effects		5.57	3.23	45.8
<b>Total</b>		<b>9.66</b>	<b>6.72</b>	<b>87.6</b>

Source: BDO EconSearch analysis.

Table 5-2 Economic contribution of recreational fishing to Queensland, 2019/20

	Expenditure (\$m)	GSP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
Direct effects				
Offshore	28.73	7.32	4.17	72.8
Coastal boat based	32.27	8.74	5.22	99.9
Coastal shore based	16.13	5.38	3.29	66.3
Inland boat based	5.85	1.69	1.09	23.0
Inland shore based	2.48	0.59	0.37	6.7
Total Direct	85.45	23.72	14.14	268.8
Flow-on effects				
Offshore		9.85	5.28	73.7
Coastal boat based		12.32	6.71	95.2
Coastal shore based		7.31	3.97	56.2
Inland boat based		2.32	1.25	17.4
Inland shore based		0.83	0.44	6.2
Total Flow-on		32.63	17.65	248.7
<b>Total</b>				
Offshore		17.16	9.45	146.5
Coastal boat based		21.06	11.93	195.1
Coastal shore based		12.69	7.26	122.5
Inland boat based		4.01	2.34	40.4
Inland shore based		1.42	0.81	13.0
<b>Total</b>		<b>56.35</b>	<b>31.79</b>	<b>517.5</b>
<i>Off-trip</i>				
Direct effects	542.15	114.64	83.81	1,280.2
Flow-on effects		162.73	93.92	1,338.0
<b>Total</b>		<b>277.37</b>	<b>177.73</b>	<b>2,618.3</b>
<i>Combined</i>				
Direct effects	627.60	138.36	97.96	1,549.0
Flow-on effects		195.36	111.57	1,586.7
<b>Total</b>		<b>333.72</b>	<b>209.52</b>	<b>3,135.7</b>

Source: BDO EconSearch analysis.

Table 5-3 Economic contribution of recreational fishing to Queensland after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GSP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	27.78	7.08	4.04	70.46
Coastal boat based	31.24	8.48	5.07	97.00
Coastal shore based	15.66	5.22	3.20	64.44
Inland boat based	5.69	1.65	1.06	22.40
Inland shore based	2.40	0.57	0.35	6.51
<b>Total Direct</b>	<b>82.78</b>	<b>23.00</b>	<b>13.72</b>	<b>260.8</b>
<b>Flow-on effects</b>				
Offshore		9.59	5.14	71.7
Coastal boat based		12.02	6.54	92.8
Coastal shore based		7.15	3.88	54.9
Inland boat based		2.27	1.22	17.1
Inland shore based		0.81	0.43	6.1
<b>Total Flow-on</b>		<b>31.83</b>	<b>17.20</b>	<b>242.5</b>
<b>Total</b>				
Offshore		16.67	9.18	142.2
Coastal boat based		20.49	11.60	189.8
Coastal shore based		12.37	7.07	119.3
Inland boat based		3.92	2.29	39.5
Inland shore based		1.38	0.78	12.6
<b>Total</b>		<b>54.83</b>	<b>30.92</b>	<b>503.3</b>
<i>Off-trip</i>				
Direct effects	542.15	114.64	83.81	1,280.2
Flow-on effects		162.73	93.92	1,338.0
<b>Total</b>		<b>277.37</b>	<b>177.73</b>	<b>2,618.3</b>
<i>Combined</i>				
Direct effects	624.92	137.64	97.53	1,541.0
Flow-on effects		194.56	111.12	1,580.5
<b>Total</b>		<b>332.20</b>	<b>208.65</b>	<b>3,121.6</b>

Source: BDO EconSearch analysis.

## 5.2. Cape York Peninsula (including Torres Strait)

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Cape York Peninsula economy in 2019/20 are outlined in Table 5-4. Table 5-5 presents the results adjusted for COVID-19 effects and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$56.61m, the total recreational fishing related contribution to GRP in the Cape York Peninsula region was \$13.88m in 2019/20, with \$8.84m generated by recreational fishing directly and \$5.04m supported in other sectors of the regional economy through flow-on effects (Table 5-4).

The top five most affected sectors in terms of total GRP were Retail Trade (\$3.25m), Other Machinery & Equipment (\$1.83m), Public Admin & Regulatory Services (\$1.43m), Ownership of Dwellings (\$1.39m), and Road Transport (\$1.08m).

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$8.81m and including flow-on effects was an estimated total contribution to GRP of \$13.84m (Table 5-5).

### Household income

Direct contribution to household income of \$6.30m was estimated as a result of recreational fishing activity in 2019/20. A further \$2.43m of income was earned by wage earners in other businesses in the Cape York Peninsula region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the region was \$8.73m (Table 5-4).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$6.28m and including flow-on effects was an estimated total contribution to household income of \$8.70m (Table 5-5).

### Employment

Total recreational fishing related contribution to employment in the Cape York Peninsula region was 134.3 fte jobs in 2019/20, with 97.5 fte jobs generated by recreational fishing directly and 36.7 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-4).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 97.1 fte jobs and including flow-on effects was an estimated total contribution to employment of 133.7 fte jobs (Table 5-5).

Table 5-4 Economic contribution of recreational fishing to Cape York Peninsula, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
Direct effects				
Offshore	2.52	0.43	0.31	5.8
Coastal boat based	1.46	0.34	0.25	4.0
Coastal shore based	0.43	0.10	0.07	1.4
Inland boat based	0.42	0.07	0.05	1.0
Inland shore based	0.26	0.06	0.04	0.9
Total Direct	5.10	1.01	0.73	13.1
Flow-on effects				
Offshore		0.28	0.13	2.1
Coastal boat based		0.21	0.10	1.5
Coastal shore based		0.06	0.03	0.5
Inland boat based		0.04	0.02	0.3
Inland shore based		0.04	0.02	0.3
Total Flow-on		0.63	0.30	4.7
<b>Total</b>				
Offshore		0.71	0.44	7.9
Coastal boat based		0.55	0.35	5.5
Coastal shore based		0.16	0.10	1.9
Inland boat based		0.12	0.07	1.3
Inland shore based		0.10	0.06	1.2
<b>Total</b>		<b>1.64</b>	<b>1.03</b>	<b>17.8</b>
<i>Off-trip</i>				
Direct effects	51.52	7.83	5.58	84.4
Flow-on effects		4.41	2.13	32.0
<b>Total</b>		<b>12.24</b>	<b>7.71</b>	<b>116.4</b>
<i>Combined</i>				
Direct effects	56.61	8.84	6.30	97.5
Flow-on effects		5.04	2.43	36.7
<b>Total</b>		<b>13.88</b>	<b>8.73</b>	<b>134.3</b>

Source: BDO EconSearch analysis.

Table 5-5 Economic contribution of recreational fishing to Cape York Peninsula after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
Direct effects				
Offshore	2.44	0.42	0.30	5.6
Coastal boat based	1.41	0.33	0.24	3.9
Coastal shore based	0.42	0.10	0.07	1.4
Inland boat based	0.41	0.07	0.05	0.9
Inland shore based	0.25	0.06	0.04	0.9
Total Direct	4.94	0.98	0.70	12.7
Flow-on effects				
Offshore		0.27	0.13	2.0
Coastal boat based		0.20	0.09	1.5
Coastal shore based		0.06	0.03	0.5
Inland boat based		0.04	0.02	0.3
Inland shore based		0.04	0.02	0.3
Total Flow-on		0.61	0.29	4.6
<b>Total</b>				
Offshore		0.69	0.43	7.7
Coastal boat based		0.53	0.34	5.3
Coastal shore based		0.16	0.10	1.8
Inland boat based		0.11	0.07	1.3
Inland shore based		0.10	0.06	1.2
<b>Total</b>		<b>1.59</b>	<b>0.99</b>	<b>17.3</b>
<i>Off-trip</i>				
Direct effects	51.52	7.83	5.58	84.4
Flow-on effects		4.41	2.13	32.0
<b>Total</b>		<b>12.24</b>	<b>7.71</b>	<b>116.4</b>
<i>Combined</i>				
Direct effects	56.45	8.81	6.28	97.1
Flow-on effects		5.03	2.42	36.6
<b>Total</b>		<b>13.84</b>	<b>8.70</b>	<b>133.7</b>

Source: BDO EconSearch analysis.

### 5.3. Dry Tropics

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Dry Tropics economy in 2019/20 are outlined in Table 5-6. Table 5-7 presents the results adjusted for COVID-19 effects and represents a more typical year.

#### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$81.54m, the total recreational fishing related contribution to GRP in the Dry Tropics region was \$30.09m in 2019/20, with \$14.99m generated by recreational fishing directly and \$15.09m supported in other sectors of the regional economy through flow-on effects (Table 5-6).

The top five most affected sectors in terms of total GRP were Retail Trade (\$4.94m), Cultural & Recreational Services (\$4.72m), Ownership of Dwellings (\$2.93m), Other Machinery & Equipment (\$2.37m), and Public Admin & Regulatory Services (\$2.09m).

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$14.96m and including flow-on effects was an estimated total contribution to GRP of \$30.04m (Table 5-7).

#### Household income

Direct contribution to household income of \$10.27m was estimated as a result of recreational fishing activity in 2019/20. A further \$8.12m of income was earned by wage earners in other businesses in the region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the Dry Tropics region was \$18.39m (Table 5-6).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$10.25m and including flow-on effects was an estimated total contribution to household income of \$18.36m (Table 5-7).

#### Employment

Total recreational fishing related contribution to employment in the Dry Tropics was 295.3 fte jobs in 2019/20, with 175.2 fte jobs generated by recreational fishing directly and 120.1 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-6).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 174.8 fte jobs and including flow-on effects was an estimated total contribution to employment of 294.7 fte jobs (Table 5-7).



Table 5-6 Economic contribution of recreational fishing to Dry Tropics, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	1.56	0.27	0.17	2.8
Coastal boat based	2.19	0.40	0.25	4.4
Coastal shore based	0.81	0.24	0.14	2.9
Inland boat based	0.09	0.01	0.01	0.1
Inland shore based	0.19	0.04	0.03	0.5
<b>Total Direct</b>	<b>4.84</b>	<b>0.96</b>	<b>0.60</b>	<b>10.7</b>
<b>Flow-on effects</b>				
Offshore		0.26	0.14	2.1
Coastal boat based		0.39	0.21	3.1
Coastal shore based		0.23	0.12	1.8
Inland boat based		0.01	0.01	0.1
Inland shore based		0.04	0.02	0.3
<b>Total Flow-on</b>		<b>0.94</b>	<b>0.49</b>	<b>7.4</b>
<b>Total</b>				
Offshore		0.54	0.31	4.9
Coastal boat based		0.79	0.46	7.5
Coastal shore based		0.47	0.26	4.7
Inland boat based		0.02	0.01	0.2
Inland shore based		0.09	0.05	0.9
<b>Total</b>		<b>1.90</b>	<b>1.09</b>	<b>18.2</b>
<i>Off-trip</i>				
Direct effects	76.70	14.03	9.68	164.4
Flow-on effects		14.15	7.62	112.7
<b>Total</b>		<b>28.18</b>	<b>17.30</b>	<b>277.1</b>
<i>Combined</i>				
Direct effects	81.54	14.99	10.27	175.2
Flow-on effects		15.09	8.12	120.1
<b>Total</b>		<b>30.09</b>	<b>18.39</b>	<b>295.3</b>

Source: BDO EconSearch analysis.

Table 5-7 Economic contribution of recreational fishing to Dry Tropics after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	1.51	0.26	0.16	2.7
Coastal boat based	2.11	0.38	0.24	4.3
Coastal shore based	0.79	0.23	0.14	2.8
Inland boat based	0.09	0.01	0.01	0.1
Inland shore based	0.18	0.04	0.03	0.5
<b>Total Direct</b>	<b>4.68</b>	<b>0.93</b>	<b>0.58</b>	<b>10.4</b>
<b>Flow-on effects</b>				
Offshore		0.26	0.14	2.0
Coastal boat based		0.39	0.20	3.1
Coastal shore based		0.22	0.12	1.8
Inland boat based		0.01	0.01	0.1
Inland shore based		0.04	0.02	0.3
<b>Total Flow-on</b>		<b>0.92</b>	<b>0.48</b>	<b>7.3</b>
<b>Total</b>				
Offshore		0.52	0.30	4.7
Coastal boat based		0.77	0.45	7.3
Coastal shore based		0.46	0.26	4.6
Inland boat based		0.02	0.01	0.2
Inland shore based		0.08	0.05	0.9
<b>Total</b>		<b>1.85</b>	<b>1.06</b>	<b>17.7</b>
<i>Off-trip</i>				
Direct effects	76.70	14.03	9.68	164.4
Flow-on effects		14.15	7.62	112.7
<b>Total</b>		<b>28.18</b>	<b>17.30</b>	<b>277.1</b>
<i>Combined</i>				
Direct effects	81.38	14.96	10.25	174.8
Flow-on effects		15.08	8.11	119.9
<b>Total</b>		<b>30.04</b>	<b>18.36</b>	<b>294.7</b>

Source: BDO EconSearch analysis.

## 5.4. Fitzroy

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Fitzroy economy in 2019/20 are outlined in Table 5-8. Table 5-9 presents the results adjusted for removing COVID-19 effects, and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$67.82m, the total recreational fishing related contribution to GRP in Fitzroy was \$20.80m in 2019/20, with \$11.04m generated by recreational fishing directly and \$9.76m supported in other sectors of the regional economy through flow-on effects (Table 5-8).

The top five most affected sectors in terms of total GRP were Retail Trade (\$4.21m), Ownership of Dwellings (\$1.96m), Accommodation (\$1.81m), Road Transport (\$1.62m), and Other Machinery & Equipment (\$1.37m).

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$10.96m and including flow-on effects was an estimated total contribution to GRP of \$20.67m (Table 5-9).

### Household income

Direct contribution to household income of \$7.77m was estimated as a result of recreational fishing activity in 2019/20. A further \$4.64m of income was earned by wage earners in other businesses in the Fitzroy region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the Fitzroy region was \$12.40m (Table 5-8).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$7.71m and including flow-on effects was an estimated total contribution to household income of \$12.33m (Table 5-9).

### Employment

Total recreational fishing related contribution to employment in the Fitzroy region was 206.8 fte jobs in 2019/20, with 136.0 fte jobs generated by recreational fishing directly and 70.9 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-8).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 134.8 fte jobs and including flow-on effects was an estimated total contribution to employment of 205.4 fte jobs (Table 5-9).

Table 5-8 Economic contribution of recreational fishing to Fitzroy, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	4.99	1.51	0.88	16.4
Coastal boat based	4.65	1.36	0.88	19.6
Coastal shore based	1.07	0.30	0.22	4.8
Inland boat based	1.28	0.37	0.24	5.3
Inland shore based	0.26	0.05	0.03	0.7
<b>Total Direct</b>	<b>12.25</b>	<b>3.60</b>	<b>2.24</b>	<b>46.8</b>
<b>Flow-on effects</b>				
Offshore		1.23	0.58	8.7
Coastal boat based		1.19	0.56	8.8
Coastal shore based		0.28	0.13	2.0
Inland boat based		0.33	0.15	2.4
Inland shore based		0.04	0.02	0.3
<b>Total Flow-on</b>		<b>3.07</b>	<b>1.43</b>	<b>22.3</b>
<b>Total</b>				
Offshore		2.74	1.45	25.1
Coastal boat based		2.55	1.43	28.4
Coastal shore based		0.58	0.35	6.9
Inland boat based		0.70	0.39	7.7
Inland shore based		0.09	0.05	1.0
<b>Total</b>		<b>6.67</b>	<b>3.67</b>	<b>69.1</b>
<i>Off-trip</i>				
Direct effects	55.57	7.44	5.53	89.1
Flow-on effects		6.69	3.20	48.6
<b>Total</b>		<b>14.13</b>	<b>8.73</b>	<b>137.7</b>
<i>Combined</i>				
Direct effects	67.82	11.04	7.77	136.0
Flow-on effects		9.76	4.64	70.9
<b>Total</b>		<b>20.80</b>	<b>12.40</b>	<b>206.8</b>

Source: BDO EconSearch analysis.

Table 5-9 Economic contribution of recreational fishing to Fitzroy after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	4.87	1.48	0.86	16.0
Coastal boat based	4.54	1.33	0.85	19.1
Coastal shore based	1.04	0.30	0.21	4.7
Inland boat based	1.25	0.37	0.23	5.2
Inland shore based	0.25	0.04	0.03	0.6
<b>Total Direct</b>	<b>11.95</b>	<b>3.51</b>	<b>2.19</b>	<b>45.7</b>
<b>Flow-on effects</b>				
Offshore		1.21	0.57	8.6
Coastal boat based		1.17	0.55	8.7
Coastal shore based		0.28	0.13	2.0
Inland boat based		0.32	0.15	2.4
Inland shore based		0.04	0.02	0.3
<b>Total Flow-on</b>		<b>3.02</b>	<b>1.41</b>	<b>21.9</b>
<b>Total</b>				
Offshore		2.69	1.42	24.6
Coastal boat based		2.51	1.40	27.8
Coastal shore based		0.57	0.34	6.7
Inland boat based		0.69	0.38	7.6
Inland shore based		0.09	0.05	0.9
<b>Total</b>		<b>6.54</b>	<b>3.60</b>	<b>67.6</b>
<i>Off-trip</i>				
Direct effects	55.57	7.44	5.53	89.1
Flow-on effects		6.69	3.20	48.6
<b>Total</b>		<b>14.13</b>	<b>8.73</b>	<b>137.7</b>
<i>Combined</i>				
Direct effects	67.52	10.96	7.71	134.8
Flow-on effects		9.71	4.61	70.5
<b>Total</b>		<b>20.67</b>	<b>12.33</b>	<b>205.4</b>

Source: BDO EconSearch analysis.

## 5.5. Mackay, Isaac and Whitsunday

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Mackay, Isaac and Whitsunday economy in 2019/20 are outlined in Table 5-10. Table 5-11 presents the results adjusted for COVID-19 effects and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$64.91m, the total recreational fishing related contribution to GRP in the Mackay, Isaac and Whitsunday economy was \$23.21m in 2019/20, with \$13.23m generated by recreational fishing directly and \$9.99m supported in other sectors of the regional economy through flow-on effects.

The top five most affected sectors in terms of total GRP were Other Machinery & Equipment (\$4.25m), Retail Trade (\$4.13m), Ownership of Dwellings (\$2.24m), Road Transport (\$1.59m), and Cultural & Recreational Services (\$1.33m)

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$13.11m and including flow-on effects was an estimated total contribution to GRP of \$23.03m (Table 5-11).

### Household income

Direct contribution to household income of \$9.46m was estimated as a result of recreational fishing activity in 2019/20. A further \$5.03m of income was earned by wage earners in other businesses in the Mackay, Isaac and Whitsunday region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the Mackay, Isaac and Whitsunday region was \$14.49m (Table 5-10).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$9.39m and including flow-on effects was an estimated total contribution to household income of \$14.39m (Table 5-11).

### Employment

Total recreational fishing related contribution to employment in Mackay, Isaac and Whitsunday region was 223.2 fte jobs in 2019/20, with 146.8 fte jobs generated by recreational fishing directly and 76.4 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-10).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 145.7 fte jobs and including flow-on effects was an estimated total contribution to employment of 221.5 fte jobs (Table 5-11).

Table 5-10 Economic contribution of recreational fishing to Mackay, Isaac and Whitsunday, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
Direct effects				
Offshore	4.49	1.34	0.71	12.0
Coastal boat based	3.59	0.71	0.43	7.5
Coastal shore based	1.00	0.34	0.19	3.8
Inland boat based	0.15	0.03	0.02	0.4
Inland shore based	0.13	0.04	0.02	0.4
Total Direct	9.37	2.46	1.36	24.1
Flow-on effects				
Offshore		0.97	0.50	7.5
Coastal boat based		0.56	0.28	4.4
Coastal shore based		0.25	0.13	2.0
Inland boat based		0.03	0.01	0.2
Inland shore based		0.03	0.01	0.2
Total Flow-on		1.84	0.94	14.3
<b>Total</b>				
Offshore		2.31	1.20	19.6
Coastal boat based		1.27	0.71	11.8
Coastal shore based		0.59	0.32	5.8
Inland boat based		0.06	0.03	0.6
Inland shore based		0.06	0.04	0.6
<b>Total</b>		<b>4.30</b>	<b>2.30</b>	<b>38.4</b>
<i>Off-trip</i>				
Direct effects	55.54	10.77	8.09	122.7
Flow-on effects		8.15	4.10	62.1
<b>Total</b>		<b>18.91</b>	<b>12.19</b>	<b>184.8</b>
<i>Combined</i>				
Direct effects	64.91	13.23	9.46	146.8
Flow-on effects		9.99	5.03	76.4
<b>Total</b>		<b>23.21</b>	<b>14.49</b>	<b>223.2</b>

Source: BDO EconSearch analysis.

Table 5-11 Economic contribution of recreational fishing to Mackay, Isaac and Whitsunday after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	4.29	1.28	0.68	11.5
Coastal boat based	3.40	0.67	0.40	7.1
Coastal shore based	0.95	0.32	0.18	3.6
Inland boat based	0.14	0.03	0.02	0.4
Inland shore based	0.12	0.03	0.02	0.4
<b>Total Direct</b>	<b>8.90</b>	<b>2.34</b>	<b>1.30</b>	<b>22.9</b>
<b>Flow-on effects</b>				
Offshore		0.94	0.48	7.3
Coastal boat based		0.54	0.27	4.2
Coastal shore based		0.24	0.12	1.9
Inland boat based		0.03	0.01	0.2
Inland shore based		0.03	0.01	0.2
<b>Total Flow-on</b>		<b>1.78</b>	<b>0.90</b>	<b>13.8</b>
<b>Total</b>				
Offshore		2.23	1.16	18.8
Coastal boat based		1.21	0.67	11.2
Coastal shore based		0.56	0.30	5.5
Inland boat based		0.06	0.03	0.6
Inland shore based		0.06	0.03	0.6
<b>Total</b>		<b>4.12</b>	<b>2.20</b>	<b>36.7</b>
<i>Off-trip</i>				
Direct effects	55.54	10.77	8.09	122.7
Flow-on effects		8.15	4.10	62.1
<b>Total</b>		<b>18.91</b>	<b>12.19</b>	<b>184.8</b>
<i>Combined</i>				
Direct effects	64.44	13.11	9.39	145.7
Flow-on effects		9.92	5.00	75.9
<b>Total</b>		<b>23.03</b>	<b>14.39</b>	<b>221.5</b>

Source: BDO EconSearch analysis.



## 5.6. North West

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the North West economy in 2019/20 are outlined in Table 5-12. Table 5-13 presents the results adjusted for COVID-19 effects and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$0.84m, the total recreational fishing related contribution to GRP in the North West region was \$0.42m in 2019/20, with \$0.25m generated by recreational fishing directly and \$0.16m supported in other sectors of the regional economy through flow-on effects.

The top five most affected sectors in terms of total GRP were Accommodation (\$0.19m), Ownership of Dwellings (\$0.04m), Retail Trade (\$0.03m), Beef Cattle (\$0.02m) and Wholesale Trade (\$0.02m)

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$0.24m and including flow-on effects was an estimated total contribution to GRP of \$0.40m (Table 5-13).

### Household income

Direct contribution to household income of \$0.16m was estimated as a result of recreational fishing activity in 2019/20. A further \$0.08m of income was earned by wage earners in other businesses in the North West region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the North West region was \$0.24m (Table 5-12).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$0.16 and including flow-on effects was an estimated total contribution to household income of \$0.23m (Table 5-13).

### Employment

Total recreational fishing related contribution to employment in the North West region was 4.8 fte jobs in 2019/20, with 3.5 fte jobs generated by recreational fishing directly and 1.3 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-12).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 3.4 fte jobs and including flow-on effects was an estimated total contribution to employment of 4.7 fte jobs (Table 5-13).

Table 5-12 Economic contribution of recreational fishing to North West, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
		<i>On-trip</i>		
<b>Direct effects</b>				
Offshore	0.05	0.02	0.01	0.3
Coastal boat based	0.61	0.19	0.13	2.8
Coastal shore based	0.08	0.01	0.01	0.2
Inland boat based	0.06	0.01	0.01	0.1
Inland shore based	0.05	0.01	0.01	0.1
<b>Total Direct</b>	<b>0.84</b>	<b>0.25</b>	<b>0.16</b>	<b>3.5</b>
<b>Flow-on effects</b>				
Offshore		0.01	0.01	0.1
Coastal boat based		0.13	0.06	1.0
Coastal shore based		0.01	0.00	0.1
Inland boat based		0.01	0.00	0.0
Inland shore based		0.01	0.00	0.1
<b>Total Flow-on</b>		<b>0.16</b>	<b>0.08</b>	<b>1.3</b>
<b>Total</b>				
Offshore		0.04	0.02	0.4
Coastal boat based		0.32	0.18	3.8
Coastal shore based		0.02	0.01	0.3
Inland boat based		0.02	0.01	0.2
Inland shore based		0.02	0.01	0.2
<b>Total</b>		<b>0.42</b>	<b>0.24</b>	<b>4.8</b>

Source: BDO EconSearch analysis.

Table 5-13 Economic contribution of recreational fishing to North West after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
		<i>On-trip</i>		
<b>Direct effects</b>				
Offshore	0.05	0.02	0.01	0.3
Coastal boat based	0.59	0.19	0.12	2.7
Coastal shore based	0.08	0.01	0.01	0.2
Inland boat based	0.06	0.01	0.01	0.1
Inland shore based	0.04	0.01	0.01	0.1
<b>Total Direct</b>	<b>0.82</b>	<b>0.24</b>	<b>0.16</b>	<b>3.4</b>
<b>Flow-on effects</b>				
Offshore		0.01	0.01	0.1
Coastal boat based		0.13	0.06	1.0
Coastal shore based		0.01	0.00	0.1
Inland boat based		0.01	0.00	0.0
Inland shore based		0.01	0.00	0.1
<b>Total Flow-on</b>		<b>0.16</b>	<b>0.07</b>	<b>1.3</b>
<b>Total</b>				
Offshore		0.03	0.02	0.4
Coastal boat based		0.31	0.18	3.7
Coastal shore based		0.02	0.01	0.3
Inland boat based		0.02	0.01	0.2
Inland shore based		0.02	0.01	0.2
<b>Total</b>		<b>0.40</b>	<b>0.23</b>	<b>4.7</b>

Source: BDO EconSearch analysis.

## 5.7. South East

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the South East economy in 2019/20 are outlined in Table 5-14. Table 5-15 presents the results adjusted for COVID-19 effects and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$193.14m, the total recreational fishing related contribution to GRP in the South East region was \$125.36m in 2019/20, with \$55.30m generated by recreational fishing directly and \$70.07m supported in other sectors of the regional economy through flow-on effects.

The top five most affected sectors in terms of total GRP were Other Machinery & Equipment (\$21.02m), Retail Trade (\$13.82m), Ownership of Dwellings (\$10.14m), Cultural & Recreational Services (\$9.42m), and Professional Scientific Technology Services (\$5.84m).

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$55.01m and including flow-on effects was an estimated total contribution to GRP of \$124.84m (Table 5-15).

### Household income

Direct contribution to household income of \$38.39m was estimated as a result of recreational fishing activity in 2019/20. A further \$41.20m of income was earned by wage earners in other businesses in the South East region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the South East region was \$79.59m (Table 5-14).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$38.23m and including flow-on effects was an estimated total contribution to household income of \$79.29m (Table 5-15).

### Employment

Total recreational fishing related contribution to employment in the South East region was 1167.4 fte jobs in 2019/20, with 584.5 fte jobs generated by recreational fishing directly and 582.9 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-14).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 581.7 fte jobs and including flow-on effects was an estimated total contribution to employment of 1162.7 fte jobs (Table 5-15).

Table 5-14 Economic contribution of recreational fishing to South East, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	8.47	2.14	1.13	18.7
Coastal boat based	13.05	3.84	2.09	37.9
Coastal shore based	8.17	2.83	1.61	31.0
Inland boat based	1.14	0.30	0.17	3.1
Inland shore based	0.98	0.27	0.15	2.7
<b>Total Direct</b>	<b>31.82</b>	<b>9.38</b>	<b>5.16</b>	<b>93.4</b>
<b>Flow-on effects</b>				
Offshore		2.76	1.42	19.9
Coastal boat based		5.14	2.83	40.0
Coastal shore based		3.50	1.96	27.9
Inland boat based		0.39	0.21	2.9
Inland shore based		0.35	0.19	2.7
<b>Total Flow-on</b>		<b>12.14</b>	<b>6.61</b>	<b>93.4</b>
<b>Total</b>				
Offshore		4.90	2.55	38.6
Coastal boat based		8.97	4.92	77.9
Coastal shore based		6.33	3.58	58.9
Inland boat based		0.70	0.37	6.0
Inland shore based		0.63	0.34	5.4
<b>Total</b>		<b>21.52</b>	<b>11.77</b>	<b>186.8</b>
<i>Off-trip</i>				
Direct effects	161.32	45.91	33.23	491.1
Flow-on effects		57.93	34.59	489.5
<b>Total</b>		<b>103.84</b>	<b>67.82</b>	<b>980.6</b>
<i>Combined</i>				
Direct effects	193.14	55.30	38.39	584.5
Flow-on effects		70.07	41.20	582.9
<b>Total</b>		<b>125.36</b>	<b>79.59</b>	<b>1167.4</b>

Source: BDO EconSearch analysis.

Table 5-15 Economic contribution of recreational fishing to South East after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	8.20	2.07	1.09	18.1
Coastal boat based	12.64	3.72	2.02	36.8
Coastal shore based	7.93	2.75	1.57	30.1
Inland boat based	1.11	0.29	0.16	3.0
Inland shore based	0.95	0.27	0.15	2.6
<b>Total Direct</b>	<b>30.82</b>	<b>9.10</b>	<b>5.00</b>	<b>90.6</b>
<b>Flow-on effects</b>				
Offshore		2.70	1.39	19.5
Coastal boat based		5.03	2.77	39.2
Coastal shore based		3.44	1.92	27.4
Inland boat based		0.38	0.20	2.9
Inland shore based		0.35	0.19	2.6
<b>Total Flow-on</b>		<b>11.90</b>	<b>6.47</b>	<b>91.5</b>
<b>Total</b>				
Offshore		4.77	2.48	37.6
Coastal boat based		8.75	4.80	75.9
Coastal shore based		6.18	3.49	57.5
Inland boat based		0.68	0.36	5.8
Inland shore based		0.61	0.33	5.2
<b>Total</b>		<b>21.00</b>	<b>11.47</b>	<b>182.1</b>
<i>Off-trip</i>				
Direct effects	161.32	45.91	33.23	491.1
Flow-on effects		57.93	34.59	489.5
<b>Total</b>		<b>103.84</b>	<b>67.82</b>	<b>980.6</b>
<i>Combined</i>				
Direct effects	192.14	55.01	38.23	581.7
Flow-on effects		69.83	41.07	581.0
<b>Total</b>		<b>124.84</b>	<b>79.29</b>	<b>1162.7</b>

Source: BDO EconSearch analysis.

## 5.8. Wet Tropics

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Wet Tropics economy in 2019/20 are outlined in Table 5-16. Table 5-17 presents the results adjusted for COVID-19 effects and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$52.40m, the total recreational fishing related contribution to GRP in the Wet Tropics region was \$23.22m in 2019/20, with \$11.51m generated by recreational fishing directly and \$11.71m supported in other sectors of the regional economy through flow-on effects.

The top five most affected sectors in terms of total GRP were Retail Trade (\$3.25m), Other Machinery & Equipment (\$2.92m), Cultural & Recreation Services (\$2.23m), Ownership of Dwellings (\$2.19m), and Transport Support & Storage (\$1.54).

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$11.45m and including flow-on effects was an estimated total contribution to GRP of \$23.11m (Table 5-17).

### Household income

Direct contribution to household income of \$7.92m was estimated as a result of recreational fishing activity in 2019/20. A further \$6.48m of income was earned by wage earners in other businesses in the Wet Tropics region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the Wet Tropics region was \$14.40m (Table 5-16).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$7.88m and including flow-on effects was an estimated total contribution to household income of \$14.34m (Table 5-17).

### Employment

Total recreational fishing related contribution to employment in the Wet Tropics region was 223.5 fte jobs in 2019/20, with 125.4 fte jobs generated by recreational fishing directly and 98.1 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-16).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 124.6 fte jobs and including flow-on effects was an estimated total contribution to employment of 222.3 fte jobs (Table 5-17).

Table 5-16 Economic contribution of recreational fishing to Wet Tropics, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	4.75	1.04	0.64	12.0
Coastal boat based	2.68	0.78	0.48	9.9
Coastal shore based	0.50	0.14	0.08	1.6
Inland boat based	0.17	0.07	0.04	1.0
Inland shore based	0.16	0.03	0.02	0.3
<b>Total Direct</b>	<b>8.27</b>	<b>2.05</b>	<b>1.26</b>	<b>24.8</b>
<b>Flow-on effects</b>				
Offshore		1.04	0.56	8.6
Coastal boat based		0.78	0.43	6.7
Coastal shore based		0.14	0.07	1.1
Inland boat based		0.07	0.04	0.6
Inland shore based		0.03	0.01	0.2
<b>Total Flow-on</b>		<b>2.05</b>	<b>1.12</b>	<b>17.2</b>
<b>Total</b>				
Offshore		2.08	1.21	20.6
Coastal boat based		1.56	0.91	16.6
Coastal shore based		0.27	0.16	2.8
Inland boat based		0.14	0.08	1.5
Inland shore based		0.05	0.03	0.5
<b>Total</b>		<b>4.10</b>	<b>2.38</b>	<b>41.9</b>
<i>Off-trip</i>				
Direct effects	44.14	9.46	6.65	100.7
Flow-on effects		9.65	5.36	80.9
<b>Total</b>		<b>19.11</b>	<b>12.02</b>	<b>181.6</b>
<i>Combined</i>				
Direct effects	52.40	11.51	7.92	125.4
Flow-on effects		11.71	6.48	98.1
<b>Total</b>		<b>23.22</b>	<b>14.40</b>	<b>223.5</b>

Source: BDO EconSearch analysis.



Table 5-17 Economic contribution of recreational fishing to Wet Tropics after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	4.59	1.01	0.62	11.6
Coastal boat based	2.60	0.76	0.46	9.6
Coastal shore based	0.49	0.13	0.08	1.6
Inland boat based	0.17	0.07	0.04	0.9
Inland shore based	0.16	0.02	0.02	0.3
<b>Total Direct</b>	<b>8.00</b>	<b>1.99</b>	<b>1.22</b>	<b>24.0</b>
<b>Flow-on effects</b>				
Offshore		1.02	0.55	8.4
Coastal boat based		0.77	0.42	6.5
Coastal shore based		0.13	0.07	1.1
Inland boat based		0.07	0.04	0.6
Inland shore based		0.03	0.01	0.2
<b>Total Flow-on</b>		<b>2.01</b>	<b>1.10</b>	<b>16.8</b>
<b>Total</b>				
Offshore		2.02	1.17	20.0
Coastal boat based		1.53	0.88	16.1
Coastal shore based		0.26	0.15	2.7
Inland boat based		0.13	0.08	1.5
Inland shore based		0.05	0.03	0.5
<b>Total</b>		<b>4.00</b>	<b>2.32</b>	<b>40.7</b>
<i>Off-trip</i>				
Direct effects	44.14	9.46	6.65	100.7
Flow-on effects		9.65	5.36	80.9
<b>Total</b>		<b>19.11</b>	<b>12.02</b>	<b>181.6</b>
<i>Combined</i>				
Direct effects	52.13	11.45	7.88	124.6
Flow-on effects		11.67	6.46	97.7
<b>Total</b>		<b>23.11</b>	<b>14.34</b>	<b>222.3</b>

Source: BDO EconSearch analysis.

## 5.9. Wide Bay Burnett

Estimates of the economic contribution of recreational fishing in Queensland by Queenslanders to the Wide Bay Burnett economy in 2019/20 are outlined in Table 5-18. Table 5-19 presents the results adjusted for COVID-19 effects and represents a more typical year.

### Contribution to GRP

For an estimated total expenditure on recreational fishing of \$82.03m, the total recreational fishing related contribution to GRP in the Wide Bay Burnett region was \$35.24m in 2019/20, with \$17.87m generated by recreational fishing directly and \$17.37m supported in other sectors of the regional economy through flow-on effects.

The top five most affected sectors in terms of total GRP were Retail Trade (\$5.38m), Other Machinery and Equipment (\$5.06m), Ownership of Dwellings (\$3.61m), Cultural & Recreational Services (\$2.24m), and Road Transport (\$2.23m).

Removing the effect of COVID-19, the direct contribution to GRP was an estimated \$17.80 and including flow-on effects was an estimated total contribution to GRP of \$35.13m (Table 5-19).

### Household income

Direct contribution to household income of \$13.64m was estimated as a result of recreational fishing activity in 2019/20. A further \$9.04m of income was earned by wage earners in other businesses in the Wide Bay Burnett region from the flow-on effects of recreational fishing spending. The estimated total household income contribution in the Wide Bay Burnett region was \$22.68m (Table 5-18).

Removing the effect of COVID-19, the direct contribution to household income was an estimated \$13.60 and including flow-on effects was an estimated total contribution to household income of \$22.62m (Table 5-19).

### Employment

Total recreational fishing related contribution to employment in the Wide Bay Burnett region was 358.9 fte jobs in 2019/20, with 217.5 fte jobs generated by recreational fishing directly and 141.4 fte jobs supported in other sectors of the regional economy through flow-on effects (Table 5-18).

Removing the effect of COVID-19, the direct contribution to employment was an estimated 216.6 fte jobs and including flow-on effects was an estimated total contribution to employment of 357.6 fte jobs (Table 5-19).

Table 5-18 Economic contribution of recreational fishing to Wide Bay Burnett, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
Direct effects				
Offshore	1.57	0.50	0.28	4.1
Coastal boat based	3.16	1.00	0.65	12.5
Coastal shore based	3.68	1.35	0.91	19.7
Inland boat based	1.49	0.57	0.39	8.5
Inland shore based	0.07	0.01	0.01	0.2
Total Direct	9.97	3.44	2.24	45.0
Flow-on effects				
Offshore		0.39	0.20	3.1
Coastal boat based		0.93	0.47	7.6
Coastal shore based		1.31	0.66	10.8
Inland boat based		0.55	0.28	4.5
Inland shore based		0.01	0.01	0.1
Total Flow-on		3.19	1.62	26.2
<b>Total</b>				
Offshore		0.89	0.49	7.2
Coastal boat based		1.93	1.12	20.1
Coastal shore based		2.66	1.57	30.5
Inland boat based		1.12	0.66	13.1
Inland shore based		0.03	0.02	0.3
<b>Total</b>		<b>6.63</b>	<b>3.86</b>	<b>71.2</b>
<i>Off-trip</i>				
Direct effects	72.06	14.44	11.40	172.5
Flow-on effects		14.18	7.42	115.2
<b>Total</b>		<b>28.61</b>	<b>18.83</b>	<b>287.7</b>
<i>Combined</i>				
Direct effects	82.03	17.87	13.64	217.5
Flow-on effects		17.37	9.04	141.4
<b>Total</b>		<b>35.24</b>	<b>22.68</b>	<b>358.9</b>

Source: BDO EconSearch analysis.

Table 5-19 Economic contribution of recreational fishing to Wide Bay Burnett after removing the effects of COVID-19, 2019/20

	Expenditure (\$m)	GRP (\$m)	Household income (\$m)	Employment (fte jobs)
<i>On-trip</i>				
<b>Direct effects</b>				
Offshore	1.53	0.49	0.28	4.0
Coastal boat based	3.09	0.98	0.64	12.3
Coastal shore based	3.61	1.32	0.89	19.3
Inland boat based	1.46	0.56	0.38	8.3
Inland shore based	0.07	0.01	0.01	0.2
<b>Total Direct</b>	<b>9.76</b>	<b>3.36</b>	<b>2.19</b>	<b>44.1</b>
<b>Flow-on effects</b>				
Offshore		0.38	0.20	3.1
Coastal boat based		0.92	0.47	7.5
Coastal shore based		1.30	0.65	10.7
Inland boat based		0.55	0.27	4.5
Inland shore based		0.01	0.01	0.1
<b>Total Flow-on</b>		<b>3.16</b>	<b>1.60</b>	<b>25.9</b>
<b>Total</b>				
Offshore		0.87	0.48	7.1
Coastal boat based		1.90	1.10	19.8
Coastal shore based		2.62	1.55	30.0
Inland boat based		1.10	0.65	12.8
Inland shore based		0.03	0.02	0.3
<b>Total</b>		<b>6.52</b>	<b>3.79</b>	<b>70.0</b>
<i>Off-trip</i>				
Direct effects	72.06	14.44	11.40	172.5
Flow-on effects		14.18	7.42	115.2
<b>Total</b>		<b>28.61</b>	<b>18.83</b>	<b>287.7</b>
<i>Combined</i>				
Direct effects	81.82	17.80	13.60	216.6
Flow-on effects		17.33	9.02	141.1
<b>Total</b>		<b>35.13</b>	<b>22.62</b>	<b>357.6</b>

Source: BDO EconSearch analysis.

## 6. TOTAL VALUE AND CONSUMER SURPLUS VALUE RESULTS

### 6.1. Preliminary Summary Statistical Analysis

Table 6-1 provides summary statics for travel costs and frequency of recreational trips, including regional aggregates, annual averages per-household and per-person average expenditures per trip for trip costs, off-trip costs and journey-time costs.

Table 6-1 Summary statistics by recreational fishing region

Statistics	y	x	r	l	k	v	g	j	q
Total number of trips	556,563	125,284	94,544	131,024	158,853	83,174	30,409	6,693	9,704
Total number of households that visited	147,233	63,431	33,365	35,787	49,626	26,755	11,378	3,208	6,259
Average number of trips per household	3.8	2.0	2.8	3.7	3.2	3.1	2.7	2.1	1.6
Average number of fishers per household	2.5	2.4	2.7	2.5	2.5	2.3	2.6	2.2	2.4
Average number of days fished per trip	1.3	1.9	1.9	1.3	1.4	1.5	1.6	2.3	1.4
Total annual trip costs (\$m)	25	13	12	11	10	6	3	1	0.5
Average trip costs per household (\$)	45	107	122	83	65	75	94	182	49
Average annual trip costs per household (\$)	170	211	345	305	210	234	252	380	77
Average annual trip costs per person (\$)	68	88	128	122	84	102	97	173	32
Total off-trip costs (\$m)	111	78	62	74	110	32	24	0.5	2
Average off-trip costs per household per trip (\$)	199	626	654	568	692	381	779	68	168
Average off-trip costs per household (\$)	754	1,236	1,852	2,079	2,217	1,185	2,083	143	261
Average annual off-trip costs per person (\$)	302	515	686	832	887	515	801	65	109
Total annual journey-time costs (\$m)	5	3	2	2	2	1	0.5	0.6	0.2
Average journey-time costs per household per trip (\$)	9	23	24	13	12	16	13	86	18
Average annual journey-time costs per household (\$)	32	45	67	46	38	50	36	179	28
Average annual journey-time costs per person (\$)	13	19	25	18	15	22	14	81	12
Total expenditure (\$m)	141	95	76	87	122	39	27	2	2
Average overall expenditure per household per trip (\$)	253	756	799	664	770	472	887	336	236
Average annual overall expenditure per household (\$)	956	1,492	2,264	2,429	2,464	1,468	2,371	702	366
Average overall annual expenditure per person (\$)	382	622	838	972	986	638	912	319	153
Average overall expenditure per person per trip (\$)	101	315	296	265	308	205	341	153	98

Source: BDO EconSearch analysis.

The minimum value of total regional expenditures by recreational fishers in 2019/20 was calculated as \$2m for recreational fishing regions *j* and *q* and the maximum was estimated as \$122m in recreational fishing region *k*. The average total expenditure per person per trip varied across the recreational fishing regions ranging between \$98 in recreational fishing region *q* and \$341 in recreational fishing region *g*. There was significant variation in the average overall annual expenditure per person from \$153 in recreational fishing region *q* to \$986 in recreational fishing region *k*. Aggregate and average regional trip costs, off-trip costs and journey-time costs also varied considerably across the recreational fishing regions.

## 6.2. Total Value and Consumer Surplus Estimates

Table 6-2 presents total value and CS value estimates calculated using the travel cost model for each recreational fishing region. The total value in each recreational fishing region was estimated at a minimum value of \$3m in recreational fishing region *j* and a maximum of \$232m in recreational fishing region *y*. There was significant variation in the regional aggregate consumer surplus value from \$1m in region *j* to \$92m in recreational fishing region *y*. However, the average consumer surplus value per person per trip varied less across the recreational fishing regions ranging between \$56 in recreational fishing region *r* and \$76 in recreational fishing region *j*.

Table 6-2 shows estimates the total value of recreational fishing and consumer surplus values for each recreational-fishing region, per-household and per-person adjusted for the impact of COVID-19. Overall, the increase in the frequency of trips in March and April 2020 due to COVID-19 resulted in a consumer surplus value estimate that was \$6.1m greater for 2019/20 than would be expected in a normal 12 month period. Most significantly, a scenario that adjusted for the impact of COVID-19 on the frequency of trips in March and April 2020 estimated regional aggregate consumer surplus values at \$88m for region *y*, or 4 per cent less than the estimated consumer surplus value without the adjustment.

The aggregate annual value of recreation fishing in Queensland's nine major recreational fishing regions was estimated at \$788m based on observational data from the 2019/20. The annual value estimate was estimated at \$782m after adjusting for the impact of COVID-19 on the frequency of trips made in March and April 2020. The total annual expenditure value on recreational fishing activities for the nine regions was \$591m in 2019/20, or 93 per cent of the statewide aggregate expenditure for 2019/20. Our recommendation is to improve on this estimate by collecting sufficient data in future surveys for the omitted recreational fishing regions representing seven per cent of the total statewide expenditure.

Table 6-2 Total value and consumer surplus (CS) value estimates by recreational fishing region

Indicator	Recreational fishing region								
	y	x	r	l	k	v	g	j	q
Total value (\$m)	232	116	90	109	148	53	32	3	4
Total value per household (\$)	1,578	1,826	2,693	3,052	2,990	1,976	2,824	1,049	630
Total value per household per trip (\$)	417	925	950	834	934	636	1,057	503	407
Total value per person per trip (\$)	167	385	352	333	374	276	406	229	169
Total value per person (\$)	631	761	997	1,221	1,196	859	1,086	477	263
Total value per person per day (\$)	128	203	185	257	267	184	254	99	121
Annual regional CS (\$m)	92	21	14	22	26	14	5	1	2
Annual CS per household (\$)	622	334	429	623	526	508	453	347	264
CS per household per trip (\$)	165	169	151	170	164	163	169	166	170
CS per person per trip (\$)	66	70	56	68	66	71	65	76	71
Annual CS per person (\$)	249	139	159	249	210	221	174	158	110
CS per person per day (\$)	51	37	30	52	47	47	41	33	51

Source: BDO EconSearch analysis.

Table 6-3 Total value and consumer surplus (CS) value estimates by recreational fishing region after removing the effects of COVID-19

Indicator	Recreational fishing region								
	y	x	r	l	k	v	g	j	q
Total value (\$m)	229	115	90	108	148	53	32	3	4
Total value per person (\$)	623	758	994	1,207	1,190	855	1,086	477	263
Annual regional CS (\$m)	88	21	14	21	25	13	5	1	2
Annual CS per household (\$)	601	327	419	589	510	499	453	347	264
Annual CS per person (\$)	240	136	155	236	204	217	174	158	110

Source: BDO EconSearch analysis.

## 7. DISCUSSION

### Economic contribution analysis

This study used data collected from the statewide recreational fishing survey (SRFS19) on trip expenditures and off-trip expenditures by recreational fishers to estimate the economic contribution of recreational fishing by Queenslanders to Queensland. A summary of these contributions by region, described in terms of expenditures, contribution to GSP, household income and employment, is provided in Table 7-1.

Table 7-1 Economic contribution of recreational fishing to Queensland, 2019/20

Region	Expenditure (\$m)	Total		
		GSP <sup>a</sup> (\$m)	Household income (\$m)	Employment (fte jobs)
Cape York Peninsula (including Torres Straits)	56.6	13.9	8.7	134
Dry Tropics	81.5	30.1	18.4	295
Fitzroy	67.8	20.8	12.4	207
Mackay, Issac and Whitsunday	64.9	23.2	14.5	223
North West	0.8	0.4	0.2	5
South East	193.1	125.4	79.6	1,167
Wet Tropics	52.4	23.2	14.4	224
Wide Bay Burnett	82.0	35.2	22.7	359
<i>Rest of Queensland &amp; interregional trade</i>	28.3	61.5	38.6	522
<b>Queensland</b>	<b>627.6</b>	<b>333.7</b>	<b>209.5</b>	<b>3,136</b>

<sup>a</sup> GSP for Queensland, GRP for regions and rest of Queensland & interregional trade

Source: BDO EconSearch analysis.

Economic contribution is generated by recreational fishers' expenditures both on fishing trips (on-trip) and on expenditures on items and activities to support their recreational fishing (off-trip). The recreational fishing expenditures made to businesses and services was an estimated \$627.6m in 2019/20. This resulted in the following economic contributions: \$333.7m in total GSP (i.e. including direct and flow-on contributions), \$209.5m in total household income and 3,136 fte jobs.

The eight regions analysed comprised approximately 82 per cent of the economic contribution of recreational fishing by Queenslanders to the Queensland economy. The largest contributor was the South East region (38 per cent of total GSP share), followed by the Wide Bay Burnett and Dry Tropics regions (11 per cent and 9 per cent share of total GSP, respectively). These regions combined, comprised 57 per cent of the share of total GSP contribution.

The 2019/20 estimates of the economic contribution were adjusted to factor in COVID-19 effects on the frequency of recreational fishing trips in March and April 2020 to provide estimates that were representative of a 'normal' 12 month period without the effects of COVID-19. A summary of this adjusted analysis is provided in Table 7-2.



**Table 7-2 Economic contribution of recreational fishing to Queensland after removing the effects of COVID-19, 2019/20**

Region	Expenditure (\$m)	Total		
		GSP <sup>a</sup> (\$m)	Household income (\$m)	Employment (fte jobs)
Cape York Peninsula (including Torres Straits)	56.5	13.8	8.7	134
Dry Tropics	81.4	30.0	18.4	295
Fitzroy	67.5	20.7	12.3	205
Mackay, Issac and Whitsunday	64.4	23.0	14.4	222
North West	0.8	0.4	0.2	5
South East	192.1	124.8	79.3	1163
Wet Tropics	52.1	23.1	14.3	222
Wide Bay Burnett	81.8	35.1	22.6	358
<i>Rest of Queensland &amp; interregional trade</i>	28.2	61.1	38.4	519
<b>Queensland</b>	<b>624.9</b>	<b>332.2</b>	<b>208.7</b>	<b>3122</b>

Source: BDO EconSearch analysis.

As described in Table 4-1, during March and April 2020, there was a small increase in recreational fishing trips beyond that expected in a typical year (approximately 2 to 6 per cent across recreational fishing regions analysed). Consequentially, the economic contribution was larger by a small percentage than would be expected in a typical year. For Queensland, the economic contribution, in terms of total GSP, was 0.4 per cent greater than would otherwise be expected, due to COVID-19 (Table 7-2). Recreational fishing expenditures was estimated to increase by \$2.7m across Queensland. The region with the largest increase in economic contribution was the South East.

#### Scenario analysis

As described in the Methodology (Section 4.1.2), where respondents could not recall their expenditure a value of zero was used, consistent with the approach used by the SRF52019. We recognised that this will lead to a conservative estimate of total expenditure and likewise annual value of recreational fishing. A scenario was analysed that used weighted averages of recreational fishing region values for relevant cost items<sup>8</sup> for unknown expenditure values, rather than zero values. Overall expenditure, using this less conservative approach, was estimated to increase by 11 per cent to \$696.6m. The resulting economic contributions are described in Table 7-3.

This resulted in the following revised estimates of economic contributions: \$394.4m in total GSP (18 per cent increase on original analysis), \$245.8m in total household income and 3,732 fte jobs. This approach can be viewed as producing a ‘high’ estimate of economic contribution.

<sup>8</sup> Recreational fishing regions with less than 10 observations were combined to get a combined weighted average cost per item across these regions.

**Table 7-3 Economic contribution of recreational fishing to Queensland, 2019/20, ‘high’ estimate scenario analysis**

Region	Expenditure (\$m)	Total		
		GSP <sup>a</sup> (\$m)	Household income (\$m)	Employment (fte jobs)
Cape York Peninsula (including Torres Straits)	57.6	14.4	9.0	140
Dry Tropics	83.4	31.6	19.2	311
Fitzroy	75.5	25.7	15.0	254
Mackay, Issac and Whitsunday	69.2	25.9	15.9	248
North West	1.0	0.5	0.3	6
South East	231.9	158.3	99.7	1,494
Wet Tropics	58.1	27.5	16.9	269
Wide Bay Burnett	90.4	41.5	26.4	430
<i>Rest of Queensland &amp; interregional trade</i>	29.7	69.0	43.2	581
<b>Queensland</b>	<b>696.6</b>	<b>394.4</b>	<b>245.8</b>	<b>3,732</b>

Source: BDO EconSearch analysis.

#### *Comparison with other recreational fishing and other recreational activity studies*

The findings from this study were compared against other, recent state based recreational fishing studies that considered the economic value or contribution of recreational fishing, and are summarised in Table 7-4.

The current study has estimated both the economic contribution (from expenditure associated with recreational fishing expenditure circulating in the economy) and the total annual value of recreational fishing (by estimating the consumer surplus associated with those recreational fishing expenditures using TCM). The WA study (Economic Research Associates (2018)) also estimated total value, but used transferred values from international studies to estimate consumer surplus.

The 2019/20 Statewide Recreational Fishing Survey (SRFS19) generated similar, but comparatively lower expenditure per fisher, in comparison with the other studies listed. The SRFS19 used a more sophisticated economic contribution method, consistent with the current National Social and Economic Survey of Recreational Fishers (FRDC project: 2018-161) and comparable to the National fisheries and aquaculture industry social and economic contributions study (FRDC project: 2017-210). Consequently, the economic contribution estimates are comparatively more conservative, than the other studies listed in Table 7-4.

In comparison with other economic contribution studies of recreational activities, recreational hunting and sports shooting in Queensland contributed an estimated \$377m to total GSP and 2,934 fte jobs in 2018 (RMCG et al. 2019).

Table 7-4 Comparison with other economic value/contribution studies

	This Study	NSW 2020	NSW 2012	Victoria 2019	WA 2018
Economic contribution analysis?	Yes	No.	Yes	Yes	No
Consumer surplus estimated?	Yes. Estimated from survey data	No	No	No. Discussed values estimated by other studies	Yes. transferred values from other studies to estimate CS.
Scope	Recreational fishing in QLD by QLD residents	Recreational fishing in NSW by NSW residents and interstate visitors	Recreational fishing in NSW by NSW residents and interstate visitors	Recreational fishing in VIC by VIC residents	Recreational fishing in WA by WA residents
Based on a survey	Yes - covering trip, fishing gear and boat-related costs	No, update of estimates	Yes - covering trip, fishing gear and boat-related costs	Yes - covering trip and fishing gear costs. Boat related expenditure derived from another study	Yes - covering trip, fishing gear and boat-related costs
Expenditure	\$627.6m (aggregate) \$951/fisher (average)	\$2,116.8m (aggregate)	\$1.625bn (aggregate) \$1,862/fisher (average)	\$3,067/fisher (average)	\$2,410m (aggregate) \$5,951/fisher (average)
Value-added (direct+flow on)	\$333.7m (aggregate, GSP) \$506/fisher	Not reported	\$1,626m (aggregate) \$2,103/fisher	\$3,490m (aggregate) \$3,134/fisher	Not estimated
Employment (direct+flow on)	3,136 fte jobs (aggregate)	Not reported	14,254 jobs (aggregate)	27,322 fte jobs (aggregate)	Not estimated
Source:		Department of Primary Industries (NSW) 2020	McIlgorm, A. and J. Pepperell (2013)	Ernst & Young (2020)	Economic Research Associates (2018)

### *Management costs*

Fisheries Queensland incurs a cost to manage Queensland's recreational fisheries. It covers the costs of providing policy development services, regulatory/legislation and licensing services, compliance services, directorate services, extension services, monitoring and research activities, and fishery status reporting.

Recreational fishing management cost expenditures was an estimated \$6.54m in 2019/20. The economic activity generated by these fishery management expenditures contributed \$9.66m to total GSP, \$6.72m to total household income and 87.6 fte jobs to employment. Note that these economic contribution estimates relate to the management of all recreational fishing activity in Queensland, including recreational fishing in Queensland by interstate/international visitors.

### *Limitations of the economic contribution analysis*

The SRFS19 did not collect information on where expenditures were made and therefore assumptions were necessary to allocate expenditures to regions. Our allocation assumptions were broadly based on previous studies of recreational hunting and fishing where the locations of expenditures were collected. However, it was necessary to limit the expenditure allocations to home locations and trip destinations only, whereas expenditures may occur in QLD regions that were neither the home location region nor the trip destination region. Furthermore, the home location data were provided at a coarse geographical scale, limiting the ability to allocate home locations accurately to regions, in some instances<sup>9</sup>. In consequence, whilst the economic contribution estimates at the state level are reasonably accurate, the regional estimates should be treated as indicative.

The SRFS19 estimates expenditure by Queenslanders fishing in Queensland, so does not estimate total recreational fishing related expenditure in Queensland. There would be additional economic contributions to the state economy made by people visiting Queensland to go fishing. Expenditure on items such as accommodation, bait, tackle and fuel by interstate and international tourists would add to the GSP and employment estimates presented here.

### **Total value and consumer surplus value estimates**

This report provides estimates for the consumer surplus value from recreational fishing in Queensland by Queenslanders using TCM. Application of TCM to value the consumer surplus of a recreational activity is intuitively appealing because it is underpinned by real data from observations of real market transactions and based on revealed preferences of visitors travelling to undertake the recreational activity. Further, TCM utilise standard regression techniques for quantifying the relationship between the frequency of visits and the cost of travel.

We developed and estimated values for economic indicators based on observational data for the 12 months from 29<sup>th</sup> April 2019 to 28<sup>th</sup> April 2020 which was the period surveyed in the 2019-20 statewide recreational fishing survey (SRFS19). To provide estimates that are representative of a 'normal' non-COVID-19 year without COVID-19, the estimates of the economic indicators were adjusted for the impact of COVID-19 on the frequency of recreational fishing trips in March and April 2020.

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<sup>9</sup> These instances are stratum2 # 22 (Central West/South West and North West) which includes parts of the North West region and Rest of Queensland ; and, stratum2 # 26b (Far North Hinterland) which includes Cape York Peninsula (including Torres Strait), Atherton Tablelands and parts of North West and Wet Tropics.

There is some contention around the inclusion of a time based opportunity cost for travelling as a component of travel costs. As a compromise, the opportunity cost of time for travel and the time spent fishing was conservatively assumed at 50 per cent of the minimum wage value in this analysis. A sensitivity analysis revealed that exclusion of the cost of travel time would decrease the estimated aggregate statewide consumer surplus value by approximately two per cent to \$766m (Appendix Table 5-1).

Total values were not estimated in recreational fishing regions with relatively smaller sample sizes due to insufficient observations. The omitted recreational fishing regions represented seven per cent of the total statewide expenditure in 2019/20. In addition, there was insufficient data to take into account different characteristics across fishing subregions and to consider different groups of recreational fishers within regions, including boat- and shore-based fishers, in and off-shore fishers and freshwater and saltwater fishers separately. Estimating separate demand functions for each group would improve the accuracy of the travel cost models and, subsequently, consumer surplus estimates. Our recommendation is that future surveys, including the SRFS and the BRS should consider extending the amount of resources allocated towards data collection in marginal recreational fishing regions to enable more comprehensive consumer surplus valuations that will include all of Queensland's recreational fishing regions.

Statements from stakeholder interviews also suggested that restrictions on international travel led to a rise in expenditures on boats and other fishing equipment, in particular in May and June 2020 (after the survey period), due to an increase in the number of new entrants with large disposable incomes. A sensitivity analysis conducted to test the sensitivity of total value estimates to a 10 per cent decrease in off-trip costs, to adjust for an increase in March and April 2020 off-trip expenditures, found that the estimate for the aggregate total value estimate decreased by three per cent (Appendix Table 5-2).

In an additional analysis, total values were estimated for a scenario that used the weighted average for the recreational fishing region for various trip- and off-trip expenditure items where surveyed respondents stated that they did not know how much money was spent on an item instead of assigning a value of zero. The total recreational fishing expenditure under this scenario was \$619 million and the aggregate total value under this scenario was estimated at \$819 million, or larger by four per cent (Appendix Table 5-3).

Findings from this analysis were reviewed in context of other travel cost applications for estimating consumer surplus fishing value for recreational fishing and other recreational activities in Queensland and elsewhere. Other studies have also found that the frequency of fishing trips made to recreational fishing regions is relatively inelastic to changes in travel costs (Curtis, 2002; Curtis and Breen 2017; Grilli et al 2017; Pascoe et al, 2014).

We estimated the consumer surplus value for Queensland's 9 major recreational fishing regions, representing 93 per cent of the statewide total recreational fishing expenditure in 2019/10, ranging between \$110 and \$249 per person. Gregg and Rolfe (2013) found an average consumer surplus value of \$183 per angler fishing day for 31 freshwater dams in Queensland. Prayaga et al. (2010) used the TCM to estimate values for recreational fishing trips off the Capricorn Coast in Central Queensland at \$167 per angler. Elsewhere, Carlén et al. (2021) estimated the consumer surplus per fishing day in Sweden at \$121 per fishing day.

The total annual value of recreational fishing to Queensland's recreational fishers is estimated at \$788 million based on total value estimates for Queensland's nine major recreational fishing regions. The estimated annual consumer surplus for Queenslanders recreationally fishing in the nine most active SRFS19 recreational fishing regions was \$197 million. This represents a monetary value placed on recreational fishing above and beyond the expenditure actually incurred by the fishers on that activity.

## 8. CONCLUSIONS AND RECOMMENDATIONS

### Economic contribution analysis

Key conclusions and recommendations from the economic contribution analysis, include:

1. Recreational fishing expenditures by Queenslanders who fish in Queensland was an estimated \$627.6m in 2019/20. This resulted in the following economic contributions: \$333.7m in total GSP (i.e. including direct and flow-on contributions), \$209.5m in total household income and 3,136 fte jobs.
2. The eight regions analysed comprised approximately 82 per cent of the economic contribution of recreational fishing by Queenslanders to the Queensland economy. The largest contributor was the South East region (38 per cent of total GSP share), followed by the Wide Bay Burnett and Dry Tropics regions (11 per cent and 9 per cent share of total GSP, respectively). These regions combined, comprised 57 per cent of the share of total GSP contribution.
3. The economic contribution, in terms of total GSP, was 0.4 per cent greater for Queensland than would otherwise be expected, due to COVID-19.
4. The cost of managing recreational fishing contributed \$9.66m to total GSP, \$6.72m to total household income and 87.6 fte jobs to employment.
5. As the SRFS is limited to Queensland residents who fish in Queensland, this study estimates the contribution of recreational fishing by Queenslanders to the Queensland and regional economies. It excludes expenditures by interstate residents and international visitors fishing recreationally in Queensland, and is therefore an underestimate of the economic contribution of recreational fishing in Queensland.
6. The SRFS19 survey did not collect information on where expenditures were made and therefore assumptions were necessary to allocate expenditures to regions. Furthermore, the home location data were provided at a coarse geographical scale, limiting the ability to allocate home locations accurately to regions, in some instances. In consequence, whilst the economic contribution estimates at the state level are reasonably accurate, the regional estimates should be treated as indicative.
7. For future recreational fishing surveys, we recommend that the location of expenditure be captured to postcode level. This will allow the greatest flexibility in the use of the data and significantly improve the accuracy of the data in terms of location of expenditure. Understandably, this likely to be challenging for respondents to provide this information in many instances, but there are tested approaches to capture accurate location data whilst minimising cognitive load on respondents.

### Total value and consumer surplus value estimates

The aggregate annual value of recreational fishing in Queensland's major recreational fishing regions was estimated as \$788m. After adjusting for the exclusion of the impact of COVID-19 this value reduced to \$782m, a reduction of less than one per cent. The consumer surplus, a measurement of the annual net benefit value to recreational fishers, was estimated as \$197m. The total expenditure in Queensland's nine major recreational fishing regions in 2019/20 was estimated as \$591m, or 93 per cent of the aggregate statewide expenditure value of \$633 million.

Total value and consumer surplus value estimates presented in this report are robust to inclusion or exclusion of the cost of travel time, and adjustments to take into account the impact of COVID-19 in March and April 2020 and the rise in March and April 2020 expenditure on boat and fishing equipment. The results presented in this report are also robust to recall error or bias due to survey respondents forgetting the value of various on- and off-trip expenditures.

To enable comprehensive estimation of total value and net benefit value estimates across all of Queensland's recreational fishing regions, future surveys, including the SRFs and the BRS should focus on extending the amount of resources allocated to data collection in marginal recreational fishing regions. Future data collection efforts should also focus on increasing the sample size to enable estimation of different groups of recreational fishers at a sub-regional level to improve the accuracy of travel cost models and, subsequently, consumer surplus estimates.

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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 The Impact of COVID-19 on Recreational Fishing Activity in March and April 2020

Appendix Table 1-1 Perceptions on changes in recreational fishing activity in March and April 2020

Recreational fishing activity	Tourism, organised recreational fishing and marine business
<p>People did not travel and fished largely in their own backyard. Prior to that, there were a lot of mobility in people who go fishing, e.g. people come from other states and internationally to fish at the Fitzroy in Rocky - that all stopped during the peak COVID-19 period, and people just fished in their backyard for 3-4 months.</p>	<p>The 36th national angling championship and convention to be held on the Discovery Coast near town 1770 (would have been held in August 2020) did not go ahead. Expected many participants from NSW to register and up to 200 participants in total.</p>
<p>Nationally, Downturn really impacted around April/May 2020. Nobody could fish during the lockdown. People may have gone fishing but didn't go to their fav spot due to some restrictions. Upward trend started around August/September 2020.</p>	<p>Drop in interstate tourists as many people travel to QLD to rec fish and buy some of their gear in QLD. Last year when we had initial lockdown (between March and June), all fishing competition trips were cancelled. Of course, there were still a lot of fishing going on, just didn't have a lot of club competition.</p>
<p>Towards end of COVID-19 period, we saw an increase in people taking up recreational fishing (because they have nothing else to do in the absence of available interstate/overseas travel). Across the board sales of all types of tackle, lots of entry level kits for new entrants. Increase in new entrants.</p>	<p>Club competition ceased, but people could still go fishing individually. Re-commenced activities/competition since July and now back to normal. Hervey Bay runs the best competitions and did not run competition this year. Fish numbers have been down (due to rain) which may affect the number of people fishing. Poor weather affects comps as well.</p>
<p>While other people probably went more often, some people made the decision not to go fishing because they did not want to/not allowed to leave their local area. People who lived on the Gold Coast probably still went, people who lived in Brisbane would be a bit more limited in their activity. Local overnight trips wouldn't have been affected much. April-July was most impacted, with May and June being the toughest months.</p>	<p>Anecdotal evidence suggests that 2020 was really affected. Most of the clubs participate in GFAA fishing competitions, which did not go ahead for a period of time - April was the most affected. GFAA as an association decided to follow the guidelines and not organise any events during the April to June period.</p>
<p>Brisbane to Moreton Island barge did not operate for three months as they couldn't meet the social distancing requirements. Drop in activity levels observed in holiday destinations where people tend to travel long distance to and stay overnight (i.e. accommodation were needed due to camp size restrictions e.g. Fraser Island).</p>	<p>For the local tour providers, things were tough initially, but from October on where things were relaxed a bit, it was nearly back to business as usual - now people won't be able to get a booking until August.</p>
<p>Observed reduced fishing effort in the initial 3 or 4 months overall. People who did go fishing went more often, as some of them were either not working or stood down, or were receiving government payment. Increase in activity since Christmas - whenever there is a big flush of water, there are more prawns and everyone wants to go out fishing.</p>	<p>Personally travels internationally to go fishing. Anglers who plan to fish internationally will probably invest a lot more in local market. Expect to see an increase in local fishing tourism. A marine dealer in the Yeppoon area in August last year said it was the best year they had since they owned the business. People can't go travelling overseas or holiday + more discretionary finance became available, so many people have spent on boats and fishing gear.</p>
<p>Anecdotal evidence is that during the initial three to six months, people had mixed messages on whether they could or couldn't go fishing, and whether they could fish only locally or can travel. Think fishing effort was reduced broadly during the first three to six months. Personally, didn't go as often as we would have. In March, people weren't quite sure whether they can go fishing. In April and May, there are 2 to 3 times usual numbers of boats.</p>	<p>Club numbers (110 affiliated clubs that run from Cairns to Pottsville in NSW) have pretty much remained the same - got a couple of new clubs, but also lost a few. Tournaments have been affected more than from the fishing side.</p>

Recreational fishing activity	Tourism, organised recreational fishing and marine business
<p>Initially there was some uncertainty and fishing activity was restricted to local area only. Going forward, there was a significant increase in engagement in fishing, when one could travel but only within their own state.</p>	<p>Sports fishing were not affected, as people can still go out to their local areas to fish. Organised events were impacted, however. Last year there were some major tournaments that were cancelled, e.g. Gladstone runs one of the biggest tournaments in Australia and has been running it for 20 years (it is back on this year). Membership numbers for game fishing dropped since couldn't do tournaments, social days due to restrictions.</p>
<p>There was definitely higher participation in recreational fishing since October, probably driven by people who had planned to travel but obviously can't, there was a fair bit of participation from locals too. There were also new entrants into the sector who never had any previous experience, as they started taking their family to go fishing every weekend/every second weekend and still able to observe social distance.</p>	<p>All of the tackle business, caravan business and marine business were all reporting to be booming. Anecdotally, boat sales sector has done really well and that all the second-hand boats were selling really quickly. Businesses (e.g. tackle stores) have been the busiest they have been. Some good charters (e.g. those in Cairns) are now booked out 12 months in advance. Boat industry went really busy. In some showrooms where boats and jet skis were on display, even the display stocks were sold.</p>
<p>Recreational fishing did not stop a whole lot, because most people still went fishing and were able to within the allowable travel radius. The only negative impact was during a very short period when there was a declared shutdown</p>	<p>The sale of fishing tackle has gone through the roof and had to double the staff. This was natural because there was no overseas travel and limited local travel. COVID-19 had a positive effect everywhere in Queensland - people couldn't buy boats and cars, caravans and four-wheel drivers.</p>

Appendix Table 1-1 Perceptions on changes in recreational fishing activity in March and April 2020-Continued

Boat-based fishing	Shore- vs boat based fishing and regional vs metropolitan areas
<p>Boat-based fishing effort increased at some popular boat ramps. There are usually only 2 people on one boat, so social distancing wise it was fine and it did not really affect us. Personally do not see boat ramps being busier, as I usually fish at night and there are usually just the few boats.</p>	<p>It is possible that as shore-based fishing require people to go somewhere with other people around, the social distancing rules may have had more impact on their activity. When lock down and social distancing are in place, it can have some effect on the sector.</p>
<p>Anecdotally, boat sales sector has done really well and that all the second-hand boats were selling really quickly. However, people buying boats tend to be casual weekend fishers and would go a couple of times a year. In comparison, the keen anglers would go 20 times a year and tend to keep up their activity level more consistently.</p>	<p>Don't think we saw any differences in participation levels in shore based as opposed to boat based fishing. Shore based fishing isn't as big as boat based in Hervey Bay - boat based fishing is the main type in Hervey Bay.</p>
<p>Increase in activity levels (post COVID-19) is exponential. Boat ramp participation significant increased exponentially, could never get a park anywhere. The increase was most noticeable during March, April, and May (when the lockdown first happened). Where he lives, on top of a creek, where there are normally 5 boats, there were 50 boats during the period.</p>	<p>See no difference between boat- and shore-based fishing activity. The only difference is cost of fishing. Impossible to quantify the levels of shore-based fishing, as people just drive out, fish for an hour and go home. They also spread themselves out, so it is impossible to quantify the levels of activity with any statistical validity. Still saw people fishing at all the normal spots where people were fishing, suspect no appreciable changes during the period.</p>
<p>For the first one or two months, activities were restricted to local boat ramps. After June (when lock down was lifted), people can go to their usual spot and travel a bit further. They've had car park upgrades recently, where there were only a few cars at the car park before, now you get 50 or 60 cars.</p>	<p>COVID-19 had minimal impact on people's ability to go fishing in regional Queensland, as people could still go fishing as long as they can keep social distancing. Shore-based fishing probably stayed the same and marginally decreased.</p>
<p>Boat-based fishing went mad. Among the existing fishers, frequency of fishing increased. 50 per cent of people would normally go fishing a handful of time a year; during COVID-19, the 50 per cent would go monthly, weekly and even daily. People who normally go once or twice a year, went every weekend. To order a boat was 12 month wait.</p>	<p>In metropolitan areas, because it takes a lot longer for people to travel to their fish spots, when travel restriction (within 50km of the house) was in place, both boat-based and shore-based fishing would have decreased. In small regional areas, people fished a lot more. Far less impacted in the coastal regional areas/smaller towns - people would have went more frequently</p>
<p>Big boats parked in pontoons (4 or 5 people normally) could only carry people in household or amount of people which allowed for social distancing. Overall big boats weren't affected much. There is an increase in boat fishing, as people were buying new boats. Suggest to look at new boat registration data from TMR over the period.</p>	<p>Personally went fishing more, live in a small town of 1,000 people, and fishing was the only way one can get out of the house apart from exercising, shops were closed down and travel was restricted</p>
<p>Boat based fishing effort increased. Another source that may be useful is from volunteer marine rescue - coastguard. Saw a lot of them are at the boat ramps, some of them even do trailer counts (e.g. at the boat ramps in Yeppoon). Radio logs might show an increase in boat traffic.</p>	<p>Fishing activity increased for both boat- and shore-based fishing by 10-20 per cent</p>

## APPENDIX 2 Recreational Fishing Organisation Interview Questions

We invited a number of associations and organisations representing various recreational fishing stakeholders in Queensland to participate in semi-structured interviews. The following questions were asked:

1. What types of activities and regions of Queensland does ASSOCIATION NAME represent?
2. Has your organisation done any research into the effects of COVID-19? What has been done? Can you share this information?
3. What impact did COVID-19 have on recreational fishing activities (e.g. levels of activity, types of activity, locations of activity, ways activity was carried out etc.) in the regions you represent? During which periods (e.g. months) were the COVID-19 impact most noticeable?
4. We are interested to know how fishing activity changed over the period, and in particular, how boat-based fishing activity was affected compared to shore based. Do you know if the impacts were different?
5. We have some data that shows that boat based fishing effort increased at some popular boat ramps, is that consistent with your observations? Do you have any information on whether shore based effort increased or decreased?
6. Do you have any other comments on how COVID-19 has impacted the recreational fishing sector?
7. Do you see the event of COVID-19 permanently changing any aspects of the recreational fishing sector in any way?

## APPENDIX 3 Location Concordances and Activity Categories

Appendix Table 3-1 Survey home location to region concordance

Home Location	Region
Brisbane	South_East
Gold Coast	South_East
Sunshine Coast	South_East
West Moreton	South_East
Wide Bay Burnett	Wide_Bay_Burnett
Darling Downs	RoQld
CW/SW/NW	RoQld
Gladstone	Fitzroy
Rockhampton	Fitzroy
Fitzroy Hinterland	Fitzroy
Mackay	Mackay_Isaac_Whitsunday
Mackay Hinterland	Mackay_Isaac_Whitsunday
Townsville	Dry_Tropics
North Hinterland	Dry_Tropics
Cairns	Wet_Tropics
Far North Hinterland	Cape_York_Peninsula

Source: SRF52019 and BDO EconSearch analysis

Appendix Table 3-2 Survey trip destination to region concordance

Fishing subregion	Region	Fishing subregion	Region	Fishing subregion	Region
b	RoQld	k5	Dry_Tropics	s7	Fitzroy
d1	Cape_York_Peninsula	k6	Wet_Tropics	s8	Fitzroy
d2	Cape_York_Peninsula	k7	Wet_Tropics	v1	Fitzroy
d3	Cape_York_Peninsula	k8	Wet_Tropics	v2	Wide_Bay_Burnett
d4	Cape_York_Peninsula	l1	Wet_Tropics	v3	RoQld
e1	Cape_York_Peninsula	l10	Mackay_Isaac_Whitsunday	v4	RoQld
e2	Cape_York_Peninsula	l11	Mackay_Isaac_Whitsunday	v5	RoQld
e3	Cape_York_Peninsula	l2	Dry_Tropics	v6	RoQld
e4	Cape_York_Peninsula	l3	Dry_Tropics	x1	Wide_Bay_Burnett
e5	Cape_York_Peninsula	l4	Mackay_Isaac_Whitsunday	x10	Wide_Bay_Burnett
f1	Cape_York_Peninsula	l5	Mackay_Isaac_Whitsunday	x11	South_East
f2	Cape_York_Peninsula	l6	Mackay_Isaac_Whitsunday	x12	South_East
f3	North_West	l7	Mackay_Isaac_Whitsunday	x13	Wide_Bay_Burnett
f4	North_West	l8	Mackay_Isaac_Whitsunday	x2	Wide_Bay_Burnett
g1	Cape_York_Peninsula	l9	Mackay_Isaac_Whitsunday	x3	Wide_Bay_Burnett
g2	Cape_York_Peninsula	p1	North_West	x4	Wide_Bay_Burnett
g3	Cape_York_Peninsula	p2	North_West	x5	Wide_Bay_Burnett
g4	Cape_York_Peninsula	p3	RoQld	x6	Wide_Bay_Burnett
g5	Cape_York_Peninsula	p4	RoQld	x7	Wide_Bay_Burnett
g6	Cape_York_Peninsula	p5	RoQld	x8	Wide_Bay_Burnett
g7	Cape_York_Peninsula	q1	Dry_Tropics	x9	Wide_Bay_Burnett
g8	Wet_Tropics	q2	RoQld	y1	South_East
h1	North_West	q3	Fitzroy	y10	South_East
h2	North_West	q4	RoQld	y11	South_East
h3	North_West	q5	RoQld	y2	South_East
h4	North_West	r1	Fitzroy	y3	South_East
j1	North_West	r2	Fitzroy	y4	South_East
j2	North_West	r3	Fitzroy	y5	South_East
j3	North_West	r4	Fitzroy	y6	South_East
j4	North_West	s1	Mackay_Isaac_Whitsunday	y7	South_East
j5	North_West	s2	Mackay_Isaac_Whitsunday	y8	South_East
k1	Wet_Tropics	s3	Mackay_Isaac_Whitsunday	y9	South_East
k2	Wet_Tropics	s4	Mackay_Isaac_Whitsunday	c	Dry_Tropics
k3	Dry_Tropics	s5	Mackay_Isaac_Whitsunday	c	Wet_Tropics
k4	Wet_Tropics	s6	Fitzroy	t	South_East
				t	Fitzroy

Source: SRF52019 and BDO EconSearch analysis



Appendix Table 3-3 Activity category groupings

Activity category	Water body type	Platform type
Offshore	Offshore (more than 5 km)	Boat - private or hire
Offshore		Charter boat
Offshore		Shore - ocean beach
Offshore		Shore - ocean rocks
Offshore		Shore - other
Coastal boat based	Inshore (within 5km)	Boat - private or hire
Coastal boat based		Charter boat
Coastal shore based		Shore - ocean beach
Coastal shore based		Shore - ocean rocks
Coastal shore based		Shore - other
Inland boat based	River / stream	Boat - private or hire
Inland boat based		Charter boat
Inland shore based		Shore - ocean beach
Inland shore based		Shore - ocean rocks
Inland shore based		Shore - other
Inland boat based	Lake / dam	Boat - private or hire
Inland boat based		Charter boat
Inland shore based		Shore - ocean beach
Inland shore based		Shore - ocean rocks
Inland shore based		Shore - other
Coastal boat based	Sheltered marine waters	Boat - private or hire
Coastal boat based		Charter boat
Coastal shore based		Shore - ocean beach
Coastal shore based		Shore - ocean rocks
Coastal shore based		Shore - other
Coastal boat based	Net-free fishing zone	Boat - private or hire
Coastal boat based		Charter boat
Coastal shore based		Shore - ocean beach
Coastal shore based		Shore - ocean rocks
Coastal shore based		Shore - other

Source: BDO EconSearch analysis

## APPENDIX 4 Demand Function Estimation

### Determinants of travel costs

The coefficient for the frequency of trips was negative and statistically significant demonstrating a standard inverse relationship between travel costs and frequency of fishing trip (Appendix Table 4-1).

Appendix Table 4-1 Regional fixed effects travel cost model estimates

Price (cost per trip)	Coefficient	Std. Err	t	P>t	[95 per cent Conf. Interval]	
Log (visits)	-167	73	-2.29	0.002	-311	-24
Percentage of males in household	137	229	0.6	0.55	-313	586
Percentage of occupants over 60	-27	155	-0.17	0.86	-331	276
Household size	25	37	0.66	0.51	-48	98
Percentage with Year 12 or above	-240	212	-1.13	0.26	-655	175
Recreational fishing region						
<i>j</i>	-22	93	-0.24	0.81	-205	161
<i>k</i>	794	591	1.34	0.18	-365	1,953
<i>l</i>	282	150	1.88	0.06	-12	576
<i>q</i>	531	192	2.77	0.01	155	908
<i>r</i>	117	172	0.68	0.49	-219	454
<i>v</i>	170	187	0.91	0.36	-198	538
<i>x</i>	-88	181	-0.48	0.63	-442	267
<i>y</i>	-257	101	-2.54	0.01	-455	-58
Constant	365	203	1.8	0.07	-33	764
Number of observations	1,193					
Number of PSUs	936					
R-squared	0.0156					
Population size	328,097					
F(13, 923)	2.02					
Prob > F	0.0167					

Source: BDO EconSearch analysis.

The influence of household characteristics on travel costs was not statistically significant. Regional characteristics were statistically significant at influencing travel costs in particular for recreational fishing regions *l*, *q* and *y* with a positive influence in regions *l* and *q* and a negative influence in region *y* relative to the base recreational fishing region *g*.

### Determinants of frequency of fishing trips

The coefficient for price or cost per trip was negative and statistically significant demonstrating the standard inverse relationship between travel costs and frequency of fishing trips (Appendix Table 4-2).

However, the value of the coefficient for the travel cost is relatively small compared with other household characteristics showing a relatively inelastic demand<sup>10</sup>.

The coefficient for the percentage of household members over the age of 60 was positive and statistically significant showing that households with a relatively high proportion of occupants aged 60 and over made more fishing trips than households with a relatively small proportion of members aged over 60 in 2019/20.

Households with a relatively large proportion of occupants with educational attainment levels of Year 12 or higher tended to make fewer fishing trips than households with a relatively small percentage of members with the highest level of educational attainment of lower than Year 12.

Appendix Table 4-2 Determinants of frequency of fishing trips

Log (visits)	Coefficient	Std. Err	t	P>t	[95 per cent Conf. Interval]	
Price (cost per trip)	- 0.00002	0.00	-2.38	0.02	-0.00	-0.00
Percentage of males in household	-0.05	0.16	-0.33	0.74	-0.36	0.25
Percentage of occupants over 60	0.16	0.09	1.88	0.06	-0.01	0.33
Household size	0.01	0.02	0.61	0.55	-0.03	0.06
Percentage with Year 12 or above	-0.22	0.10	-2.13	0.03	-0.42	-0.02
<b>Recreational fishing region</b>						
<i>j</i>	-0.15	0.30	- 0.50	0.62	-0.73	0.43
<i>k</i>	0.36	0.19	1.95	0.05	-0.00	0.72
<i>l</i>	0.37	0.20	1.89	0.06	- 0.01	0.76
<i>q</i>	-0.27	0.21	- 1.32	0.07	-0.68	0.13
<i>r</i>	0.12	0.19	0.66	0.51	-0.25	0.50
<i>v</i>	0.14	0.26	0.53	0.60	- 0.37	0.64
<i>x</i>	-0.13	0.18	- 0.71	0.48	-0.48	0.22
<i>y</i>	0.36	0.18	1.97	0.05	0.00	0.71
Constant	0.56	0.22	2.57	0.01	0.13	0.98
Number of observations	1,193					
Number of PSUs	936					
R-squared	0.0641					
Population size	328,097					
F(13, 923)	6.33					
Prob > F	0.0641					

Source: BDO EconSearch analysis.

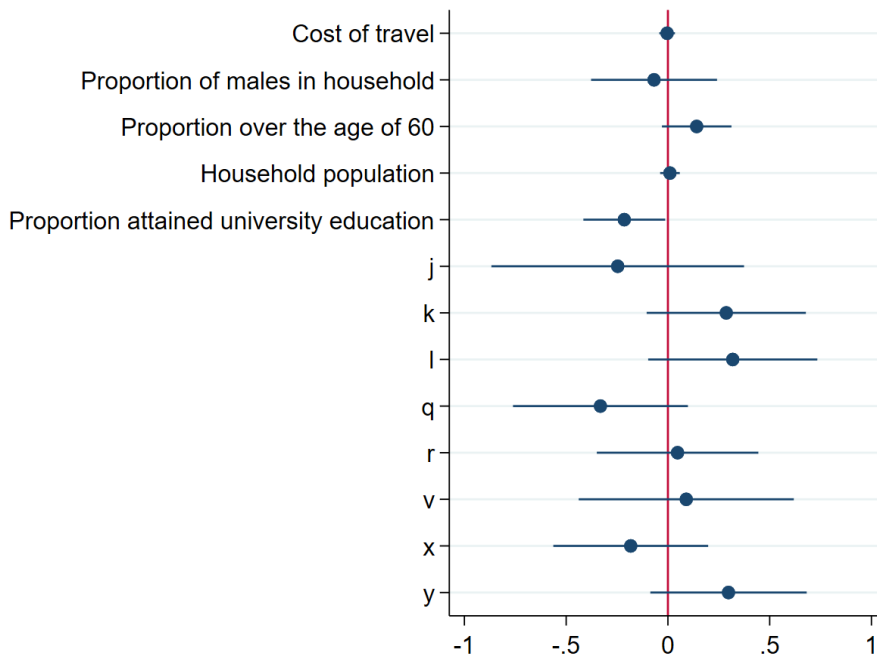
Appendix Figure 4-1 is a graphical illustration plotting the coefficients of the determinants of frequency of recreational fishing trips.

Differences in regional characteristics were positive and statistically significant at influencing differences in the frequency of trips made to recreational fishing regions *k*, *l*, *q* and *y* when compared with region *g*,

<sup>10</sup> A number of other studies have also found relatively inelastic price elasticity of demand for recreational fishing in QLD (Curtis, 2002; Curtis and Breen 2017; Grilli et al 2017; Pascoe, 2014).

the base region. Regional characteristics for recreational fishing regions *j*, *r*, *v* and *x* were not statistically significant at influencing differences in the frequency of visits in the regions relative to region *g*.

Appendix Figure 4-1 Determinants of households' frequency of visits\*



\* Recreational fishing region *g* is the base case recreational fishing region against which all the other recreational fishing regions were compared in the regional fixed effects model

Source: BDO EconSearch analysis.

## APPENDIX 5 Sensitivity Tests for Total Value Estimates

Appendix Table 5-1 Total value estimates excluding the opportunity cost of travel time

Statistics	Recreational fishing region								
	y	x	r	l	k	v	g	j	q
Total value (\$m)	224	113	87	106	146	51	32	3	4
Total value per household (\$)	1,525	1,774	2,616	2,972	2,936	1,917	2,788	870	602
Total value per household per trip (\$)	417	917	945	859	946	631	1,043	417	388
Total value per person per trip (\$)	167	382	350	343	378	274	401	190	162
Total value per person (\$)	610	739	969	1,189	1,174	833	1,072	395	251
Total value per person per day (\$)	128	201	184	264	270	183	251	82	116

Appendix Table 5-2 Total value estimates adjusted for a 10 per cent increase in off-trip expenditures for March and April, 2020

Statistics	Recreational fishing region								
	y	x	r	l	k	v	g	j	q
Total value (\$m)	224	111	86	104	142	51	31	3	4
Total value per household (\$)	1,519	1,758	2,590	2,914	2,863	1,908	2,720	1,042	617
Total value per household per trip (\$)	416	908	936	842	923	628	1,018	499	398
Total value per person per trip (\$)	166	379	347	337	369	273	391	227	166
Total value per person (\$)	608	732	959	1,166	1,145	829	1,046	474	257
Total value per person per day (\$)	128	199	182	259	264	182	245	99	118

Appendix Table 5-3 Total value estimates with unknown expenditures replaced with regional averages

Statistics	Fishing region								
	y	x	r	l	k	v	g	j	q
Total value (\$m)	234	124	97	111	157	53	34	3	4
Total value per household (\$)	1,592	1,962	2,918	3,112	3,159	1,993	3,000	1,048	635
Total value per household per trip (\$)	436	1,014	1,055	899	1,018	656	1,122	502	409
Total value per person per trip (\$)	174	422	391	360	407	285	432	228	171
Total value per person (\$)	637	817	1,081	1,245	1,264	867	1,154	476	265
Total value per person per day (\$)	134	222	206	277	291	190	270	99	122



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