

BE WHAT YOU WANT TO BE.



Final Report on the Status of the Social, Cultural (Sense of place) and Economic Components for the Gladstone Harbour 2018 Report Card

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Final Report

August 2018

Prepared for the Gladstone Healthy Harbour Partnership



Acknowledgements

The study was undertaken with the financial support of the Gladstone Healthy Harbour Partnership. We would like to thank Professor John Rolfe (CQUniversity) Chair of the Independent Science Panel for providing useful comments and advice. We would also like to acknowledge the contribution of Dr Sean Pascoe who was responsible for developing the methodology for the pilot report in 2014. The same methodology has been repeated in subsequent years without need for modification which is a tribute to the effectiveness of the initial model. We are also grateful for the support from the Gladstone community and thank the 400 anonymous respondents of the Gladstone community survey.

Citation

Jill Windle, Jeremy De Valck, Megan Star and Nicole Flint, 2018. Final report on the status of the social, cultural (Sense of place) and economic components for the Gladstone Harbour 2018 Report Card. CQUniversity. Final report to the Gladstone Healthy Harbour Partnership, August 2018.

Executive Summary

The Gladstone Harbour Report Card, first piloted in 2014, represents one of the early initiatives to incorporate social, cultural and economic indicators in an aquatic health report card. The report card has been associated with pioneering new methodologies and techniques in the assessment process such as the use of Bayesian Belief Networks to combine the different measures and indicators (Pascoe et al. 2016) and the application of nonmarket valuation techniques in the economic assessment (Windle, Rolfe & Pascoe 2017).

The Gladstone Harbour Report Card is produced annually and 2018 is the fifth consecutive year of reporting. The report card encapsulates environmental, social, cultural and economic objectives. The focus of this report is on the last three components.

Assessment and analysis

The report card comprises four levels of assessment. In this report, the results (scores and grades) are presented for the Social, Cultural ('Sense of place') and Economic components (level 1) along with their constituent indicator groups (level 2), indicators (level 3) and measures (level 4). Scores are classified into five (A-E) grades.

Baseline data used to calculate the scores for the indicator measures are collected from both primary and secondary sources. Primary data are collected in an annual community questionnaire survey of approximately 400 respondents (n=400 in 2018). In 2017, mobile phone as well as land line numbers were used to recruit respondents in the Computer Assisted Telephone Interview (CATI) survey. The practice is continued this year. Secondary data are obtained from a range of regularly updated, publically available sources.

In order to establish the relationship between the indicator groups, indicators and measures, a system of weights (derived in 2014) is applied. Each element is weighted to reflect its relative importance as a management objective. To aggregate the scores for the measures into scores for indicators, indicator groups and components, a Bayesian Belief Network (BBN) is used. This model is able to provide a probability of an outcome rather than a deterministic outcome. From the conditional probability distributions, a mean (expected) outcome and confidence interval can be determined. The numerical score is based on the weighted average of the A-E values in the distribution of outcomes. A separate BBN is developed for each component each year. Full methodological details are described in Pascoe et al. (2014). In 2016 an automated process of data analysis was introduced to estimate the scores and grades for the report card.

Assessment modifications

In 2018 four modifications were applied to the report card assessment based on recommendations outlined in the 2017 report (Windle et al. 2017) with more details in the methodology section.

Economic indicator 'Commercial fishing'

- Line fishing removed as a measure.

Economic indicator group 'Economic value (recreation)'

- 'Water-based recreation' (non-fishing) applied as an additional (fourth) indicator/measure of recreational activity.

- This affects the social indicator measure ‘Satisfaction with recreation trip’ – the assessment from the CATI survey becomes the average of four recreational activities.

Economic indicator ‘Socio-economic status’

- The measure ‘Index of Economic Resources’ updated with information from the 2016 census.

Social indicator ‘Liveability and wellbeing’

- ‘Aesthetic value’ introduced as an additional (third) measure with two related CATI questions.

Overall results

A ‘snap shot’ impression of the harbour is captured from the community survey respondents when they were asked to provide three words to describe the harbour (Section 3.2).

The three words that dominated were ‘Fishing’, ‘Beautiful’, and ‘Industrial’ (the same as in previous years). ‘Fishing’ remains dominant, followed by ‘Industrial’ and ‘Beautiful’ and the associated activity of a ‘Busy’ industrial harbour that provides many recreational opportunities and community benefits.

The importance of fishing is incorporated in the report card in terms of the economic value of both commercial and recreational fishing. The importance of industrial activity is incorporated in the report card as an indicator in the Economic component. For the first time this year the beauty and aesthetic value of the harbour is assessed as a measure for the social indicator ‘Liveability and wellbeing’.

Social

The overall grade for the Social component is a B (score of 0.67) which represents little change from last year (0.66) but a strong improvement since 2014 (0.58) (Table E1).

Table E1: Scores for the Social component, indicator groups and indicators

Social component: 2018 = 0.67 (B) 2017= 0.66 (B); 2014 = 0.58 (C)							
Indicator Group	Score/ Grade			Indicators	Score/ Grade		
	2018	2017	2014		2018	2017	2014
Harbour usability	0.63 C	0.62	0.60	Satisfaction with harbour recreational activities	0.70	0.69	0.70
				Perceptions of air and water quality	0.58	0.56	0.46
				Perceptions of harbour safety for human use	0.61	0.60	0.38
Harbour access	0.67 B	0.66	0.61	Satisfaction with access to the harbour	0.72	0.72	0.67
				Satisfaction with boat ramps + public spaces	0.66	0.65	0.60
				Perceptions of harbour health	0.63	0.63	0.53
				Perceptions of barriers to access	0.65	0.65	0.64
Liveability wellbeing	0.70 B	0.66	0.64	Liveability and wellbeing	0.70	0.66	0.64

In the last year, there has been little change in the scores for the ‘Harbour access’ and ‘Harbour usability’ indicator groups or associated indicators. The ‘Liveability and wellbeing’ indicator group/ indicator has improved its score partly as a result of the inclusion of a new measure ‘Aesthetic value’. Since the 2014 baseline, there has been consistent improvement in the three indicator groups. ‘Harbour access’ seems to have made a sustained improvement while Improvements in ‘Harbour usability’ have fluctuated. The inclusion of a new measure for aesthetic value has improved the performance of ‘Liveability and wellbeing’.

Cultural (‘Sense of place’)

There has been little change in the score for the indicator group over time with a one point change from the 2014 baseline (Table E2). There are relatively small annual changes in indicator scores. The ‘Self-esteem’ and ‘Self-efficacy’ indicators have recorded the largest improvements from the 2014 baseline (five and four points respectively), with the 2018 increase for ‘Self-efficacy’ based on an improved score for the measure ‘Input into management’. The ‘Continuity’ indicator is the only one to record a decrease from the baseline (four points) and relates to a decline in the average length of residency in the area, evident since 2017. The ‘Attitudes’ indicator continues to generate the highest score.

Residents who identify as a Traditional owner of the area continue to have statistically higher survey rating scores for three of the ‘Values’ measures: the importance of spiritually, culturally and historically special places as harbour values.

Table E2: Scores for the cultural ‘Sense of place’ indicator group and indicators

Cultural component: 2018							
Indicator Group	Score/ Grade			Indicators	Score/ Grade		
	2018	2017	2014		2018	2017	2014
Sense of place	0.65 B	0.65 B	0.64 C	Distinctiveness	0.56	0.57	0.55
				Continuity	0.53	0.54	0.57
				Self-esteem	0.74	0.72	0.69
				Self-efficacy	0.59	0.58	0.55
				Attitudes to harbour	0.83	0.81	0.80
				Values of harbour	0.65	0.66	0.64

Economic

The overall grade for the Economic component is a B (score of 0.72) which is a slight decline from 0.74 in 2017 and 0.75 in 2014. The lower score is a result of increasing unemployment and declining socio-economic status (‘Economic stimulus’) associated with the end of the construction boom in Gladstone and a decline in the resources sector. There has been no change in the score for ‘Economic performance’ and little change for ‘Economic value (recreation)’ (Table E3).

‘Economic performance’ continues to be dominated by ‘Shipping’ (\$471 million) and ‘Tourism’ (\$341 million). The economic value of recreation increases in importance with the inclusion of a fourth indicator for water-based recreation. The estimated value of recreation (\$138 million) is 40% of the estimated value for tourism. The estimated value of recreational fishing (\$31.19 million) is considerably higher than commercial fishing (\$1.64 million).

Table E3: Scores for the Economic component, indicator groups and indicators

Economic component: 2018 = 0.72 (B) 2017 = 0.74; 2014: 0.75							
Indicator Group	Score/ Grade			Indicators	Score/ Grade		
	2018	2017	2014		2018	2017	2014
Economic performance	0.90 A	0.90	0.83	Shipping activity	0.90	0.90	0.83
				Tourism	0.90	0.90	0.60
				Commercial fishing	0.35	0.35	0.66
Economic stimulus	0.58 C	0.67	0.87	Employment	0.44	0.53	0.72
				Socio-economic status	0.64	0.70	0.90
Economic (recreation) value	0.74 B	0.73	0.75	Land-based recreation	0.76	0.76	0.76
				Recreational fishing	0.68	0.65	0.67
				Beach recreation	0.75	0.74	0.71
				Water-based recreation	0.75	na	na

The score for the Economic component has only changed by three points since the 2014 baseline, but the trends for the three indicator groups are quite different. 'Economic performance' has stabilised (approaching the full extent of its capacity) after continued improvement, 'Economic stimulus' is steadily declining, and 'Economic value (recreation)' remains stable.

Since the 2014 baseline, the 'Tourism' indicator has recorded the strongest improvement (30 points) although there have been influential changes in secondary source data. The indicators 'Employment' and 'Socio-economic status' have recorded considerable declines of 28 points and 26 points respectively.

Recommendations

There are four recommendations in this report.

- The first relates to a change in the source data for the 'Tourism' indicator which will require attention for the 2019 Report Card.
- The second relates to the recreational fishing valuation update. It highlights the heterogeneity in the valuation data and emphasises the benefit of pooling data to increase sample size and the robustness of a valuation estimate.
- The third restates the 2017 recommendation to amend the method of estimating the score for the 'Commercial fishing' indicator to reduce the impact of an incomplete data source. Additional options are presented for consideration.
- The fourth restates the 2017 recommendation that the two measures 'Marine safety incidents' and 'Oil spills' be removed as measures for the social indicator 'Perceptions of harbour safety for human use' (Harbour Usability). Both measures have questionable suitability for inclusion in the indicator and the scores for both measures have an unbalanced impact on the indicator score. Notable changes in scores for both measures this year highlight the difference between these and the other two measures for the indicator.

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1. Introduction

This report provides a detailed assessment of the social, cultural (Sense of place) and economic health of the Gladstone Harbour and the scores and grades generated for the 2018 Gladstone Harbour Report Card.

The challenge of assessing and reporting socio-economic indicators in a uniform and simplistic manner has, until recently, limited their inclusion in environmental health report cards. The Gladstone Healthy Harbour Report Card, first piloted in 2014, represents one of the early initiatives to incorporate social, cultural and economic indicators in an aquatic health report card. It has been associated with pioneering new methodologies and techniques in the assessment process such as the use of Bayesian Belief Networks to combine the different measures and indicators (Pascoe et al. 2016) and the application of nonmarket valuation techniques in the economic assessment (Windle, Rolfe & Pascoe 2017).

The Gladstone Harbour Report Card is produced annually and 2018 is the fifth consecutive year of reporting. The report card comprises four levels of assessment. In this report, the results (scores and grades) are presented for the Social, Cultural (Sense of place) and Economic components (level 1) along with their constituent indicator groups (level 2), indicators (level 3) and measures (level 4). Scores are classified into five (A-E) grades (Figure 1).

The indicator groups for each of the three components are outlined below, and full details of the associated indicators and measures are provided in Appendix A.

Social

- Harbour usability
- Harbour access
- Liveability and wellbeing

With 8 indicators

And 23 measures

Cultural

- Sense of Place

With 6 indicators

And 17 measures

Economic

- Economic performance
- Economic stimulus
- Economic value (recreation)

With 9 indicators

And 11-measures

1.1 Context for this report

The initial report card for Gladstone Harbour was piloted in 2014 (Pascoe et al. 2014). Methods were developed to assess the scores and grades for the measures, indicators and indicator groups for the Social, Cultural and Economic components. Small modifications have been made in subsequent annual report cards, primarily related to minor changes associated with the secondary data sources in the Economic component and a lack of consistently available data. In 2014 and 2015, 'Sense of place' was the only indicator group assessed for the Cultural component. Since 2016, 'Indigenous cultural heritage' has been included as a second indicator group in the Cultural component with the assessment managed as a separate project. In this project, as in previous years, only the 'Sense of place' assessment is undertaken.

The current project is designed to collect the data to populate the 2018 report card applying the same previously determined methodology (Pascoe et al. 2014). The project team collected the baseline data to provide the scores for all of the measures. The process of assigning scores and combining the measures, indicators and indicator groups to determine the final grades is now fully automated. The data is managed through the Gladstone Healthy Harbour Partnership's Data and Information Management System (DIMS).

Apart from the amendments documented in the methodology section, there are no changes to the data sources or methodology compared to those applied last year in the 2017 report card (Windle et al. 2017).

In March 2018, the Australian Bureau of Statistics released detailed information from the 2016 Census to update the Index of Economic Resources ('Economic stimulus' indicator group) and these updates are now applied in the 2018 report card.

1.2 Aims and objectives

The aim of this project is to collect details and provide information for the Gladstone Harbour 2018 Report Card and more specifically to:

1. Generate report card grades and scores for the Social, Cultural ('Sense of place') and Economic components of the report card. Previously documented methods outlined in the 2014 report card (Pascoe et al. 2014) are to be followed.
2. Provide an interpretation of the results and comment on any trends and changes compared with the results from the baseline 2013-2014 reporting year.
 - a. There was a construction boom in the baseline period and a comparison with the previous reporting year (2016-2017) will also be made to identify more recent changes in the post construction phase of harbour development.
3. Outline any recommendations for changes in methodology and data collection for application in future report cards.

1.3 Background

The Gladstone Healthy Harbour Partnership (GHHP) was established with the aim of improving the environmental management and to provide scientific knowledge to support decision-making rationales (McIntosh et al. 2014). The GHHP, along with its partners, fund the development of an annual report card to guide and assist environmental management and decision-making. The report card captures not only the bio-physical aspects of the Gladstone Harbour but also social, cultural and economic aspects. This project (reporting on the social, cultural and economic aspects) is a part of a coordinated approach led by the GHHP. All of the projects are designed to provide sound scientific basis for the ongoing provision of a GHHP report card to the Gladstone community, industry stakeholders and all other interested parties. Similarly, all projects are guided by the objectives identified by the GHHP. These objectives were developed from the information provided by stakeholders and the GHHP at collaborative workshops in 2013 and are outlined in Box 1.

Box 1: Objectives identified by the GHHP

Economic objectives

- The Gladstone Harbour is managed to support shipping, transport and a diversity of industries
- Economic activity in the Gladstone Harbour continues to generate social and economic benefits to the regional community

Social objectives

- Maintain (relative to an agreed reference point) or improve easy access to the harbour waters and foreshore for recreation and community uses
- Maintain (relative to an agreed reference point) or improve a safe harbour for all users (e.g. swimming, boating and foreshore activities)

Cultural objectives

- The Gladstone community's sense of identity and satisfaction with the condition of the harbour is increased
- Registered cultural heritage sites associated with the harbour and waterways are protected

Environmental objectives

- Maintain/improve habitat function and structure of key ecosystems
- Maintain/improve connectivity of water within and between Gladstone Harbour, related rivers, estuaries and adjacent waters
- Maintain sustainable populations of fauna species reliant on the harbour and waterways
- Maintain water and sediment quality at levels compliant with the appropriate guidelines

The GHHP report card grading system is depicted below. In this report, scores are reported for all levels of aggregation (component, indicator group, indicator and measure). Corresponding grades are either reported directly or can be inferred from colour codes in the relevant tables.



Figure 1: The grading scale used in the Gladstone Harbour report card

2. Methods

The GHHP vision includes detailed statements relating to environmental, social, cultural and economic aspects of the health of Gladstone Harbour. The vision was used to determine the indicators for the GHHP report card and was developed by the local Gladstone community, including: Traditional Owners, community members, government, research organisations, conservation groups, recreational and commercial fishers and industry. A series of candidate indicators to assess the socio-economic health of the harbour was suggested by the GHHP Independent Science Panel (ISP) in 2014 (McIntosh et al. 2014).

The appropriate measures to evaluate these candidate indicators were identified in the 2014 pilot report card (Pascoe et al. 2014) with some minor modifications in subsequent reports. Data have been collected from both primary (community questionnaire survey) and secondary sources. In 2018, the same data sources described in the 2017 report are applied. Some amendments to indicator assessment are applied in 2018, based on 2017 recommendations (Windle et al. 2017), with details outlined below.

Detailed explanations of the methods applied to calculate the report card scores and grades have been provided for the 2014 report card (Pascoe et al. 2014) and the same methods are repeated in 2018 with only a summary overview provided for reference.

2.1 Indicator measures, data sources and report card scores

Full details of the indicators, measures, data sources and baseline data used for the social, cultural and economic indicator groups are outlined in Table 1, Table 2, and Table 3 respectively. Modifications in data analysis implemented in 2018 are detailed in Table 4.

The baseline data for all social indicator measures, except for 'Marine safety incidents' and 'Oil spills' (secondary data sources), and the cultural 'Sense of place' indicator measures are collected in a CATI (computer assisted telephone interview) community survey. Survey responses are recorded on a 1-10 scale such as 1 = strongly disagree to 10 = strongly agree. This readily translates into a 0 to 1 index for the report card score. However, the report card scores are derived from the distribution of responses (weighted average) across the A-E grades and differ from the mean scores that are reported in the results from the survey. For example in 2014, the 'Sense of Place' indicator measure 'Gladstone Harbour is a key part of the Gladstone community' received a score of 0.79 based on a 59% likelihood that it would score an A, a 31% likelihood it would score a B, 6% likelihood it would score a C and, a 3% and 1% chance of a D and E respectively (Pascoe et al. 2014: Figure 82). The mean score from the CATI survey was 8.53 (Pascoe et al. 2014: Figure 18).

The baseline data for all economic indicator measures utilise secondary data sources apart from the indicator group 'Economic (recreation) value' where information is collected in the CATI survey. A formalised modelling approach (capacity utilisation) is applied to calculate the scores for the main measures in the 'Economic performance' indicator group. In each case, a score between 0 and 1 is produced and the same proportional allocation to grades is made as for the survey derived data. Details are provided in Pascoe et al. (2014).

2.1.1 Defining benchmarks

An assessment of performance requires measurement against some benchmark or reference level and different approaches are applied. The data from the CATI survey does not have an inbuilt reference point and the benchmark for comparison is with the baseline (first) year of reporting (2014).

A range of different inbuilt benchmarks are applied for much of the secondary data, depending on the availability and form of the data. In most cases, the data are compared to similar data for other regions or time periods. Where time series data is available a 10-year moving average is applied.

While a benchmark is designed to provide a stable basis for comparison, some benchmarks may be more fluid such as applying a 10-year moving average. People's perceptions are also known to be subject to 'shifting' benchmarks as perceptions of what is considered 'normal' change over time. For example, as more people use the harbour, overcrowding may become a problem, but over time higher levels of activity become more normal and therefore the problem may be perceived differently.

Table 1: Social component: Indicator groups, indicators, measures and data sources

Indicator Groups	Indicators	Measures	Data Source	Baseline data
Harbour usability	Satisfaction with harbour recreational activities	How satisfied with last trip	CATI Survey (avg: Qus: 11b, 12b1, 15b, 25)	10 point scale
		Quality of ramps and facilities	CATI Survey (avg: Qus: 28, 28a)	10 point scale
	Air and water quality	Water quality satisfaction	CATI Survey (Qu 40)	10 point scale
		Air quality satisfaction	CATI Survey (Qu 41)	10 point scale
		Water quality does not affect use of the harbour	CATI Survey (Qu 42)	10 point scale
	Harbour safety	Marine safety incidents	<i>Marine incidents in Queensland 2017</i> Department of Transport & Main Roads, Maritime Safety Queensland, <i>Annual Report</i>	Data 2008-2017 (calendar year). Rate of incidents in Gladstone maritime region compared to other Qld regions
			Oil spills	Queensland Dept. Transport and Main Roads, <i>Maine Pollution Data 2002-2018</i>
		Safe at night	CATI Survey (Qu 44)	10 point scale
		Happy to eat seafood	CATI Survey (Qu 43)	10 point scale
	Harbour access	Satisfaction with access to the harbour	Fair access to harbour	CATI Survey (Qu 29)
Satisfaction with ramps and public spaces		Frequency of use	CATI Survey (Qu 8)	10 point scale
		Number of ramps	CATI Survey (Qu 27)	10 point scale
		Access to public spaces	CATI Survey (Qu 26)	10 point scale
Perceptions of harbour health		Great condition	CATI Survey (Qu 33)	10 point scale
		Optimistic about future health	CATI Survey (Qu 34)	10 point scale
		Improved over the last 12 months	CATI Survey (Qu 35)	10 point scale
Barriers to access		Marine debris a problem	CATI Survey (Qu 36)	10 point scale
		Marine debris affects access	CATI Survey (Qu 37)	10 point scale
		Shipping reduced use	CATI Survey (Qu 31)	10 point scale
	Recreational boats reduced use	CATI Survey (Qu 32)	10 point scale	
Liveability and wellbeing	Contribution of harbour to liveability and wellbeing	Makes living in Gladstone a better experience	CATI Survey (Qu 45)	10 point scale
		Participate in community events	CATI Survey (Qu 46)	10 point scale
		Aesthetic value	CATI Survey (Qus 45a, 45b)	10 point scale

Table 2: Cultural component: Indicator groups, indicators, measures and data sources

Indicator Group	Indicators	Measures	Data source	Baseline data
Sense of Place	Measure of distinctiveness	No place better	CATI survey (Qu 30)	10 point scale
		Who I am	CATI survey (Qu 51)	10 point scale
	Continuity	How long lived in the area	CATI survey (Qu 3)	Proportion of life lived in area (0-100)
		Stay in area five years?	CATI survey (Qu 53)	10 point scale
	Self-esteem	Self-esteem	CATI survey (Qu 50)	10 point scale
	Self-efficacy	Quality of life	CATI survey (Qu 52)	10 point scale
		Input into management	CATI survey (Qu 47)	10 point scale
	Attitudes to Gladstone Harbour	Key part of the community	CATI survey (Qu 54)	10 point scale
		Great asset to the region	CATI survey (Qu 58)	10 point scale
		Great asset to Queensland	CATI survey (Qu 59)	10 point scale
	Values of Gladstone Harbour	Variety of marine life	CATI survey (Qu 55)	10 point scale
		Opportunities for outdoor recreation	CATI survey (Qu 56)	10 point scale
		Attracts visitors to the region	CATI survey (Qu 57)	10 point scale
		Enjoy scenery and sights	CATI survey (Qu 60)	10 point scale
		Spiritually special places	CATI survey (Qu 61)	10 point scale
		Culturally special places	CATI survey (Qu 62)	10 point scale
		Historical significance	CATI survey (Qu 63)	10 point scale

Table 3: Economic component: Indicator groups, indicators, measures and data sources

Indicator group	Indicator	Measure	Data source	Baseline data
Economic Performance	Shipping activity	Shipping activity productivity calculated from monthly shipping movements by cargo type (2017-18 financial year)	Gladstone Ports Corporation (GPC)	Time series data from 2008-09 to 2017-2018
	Tourism expenditure	Gladstone region's total tourism expenditure output (2015-16 financial year) Tourism expenditure includes an additional estimate of spending from cruise ship passengers and crew.	Expenditure on hotel accommodation (for 2007-08 to 2012-13 financial years). Expenditure on hotel accommodation and food (2013-14 financial year to present). Gladstone Regional Council Economic Profile – REPLAN 2017 ¹ Additional expenditure from cruise ships estimated from AEC (2016).	10-year average 2007-08 to 2016-17
	Commercial fishing	Productivity of net fisheries	Production (fishing effort) Queensland Fishing (QFish), Queensland Department of Agriculture and Fisheries Prices (fish, prawns crabs) ABARES – Australian fisheries and aquaculture statistics 2016 (published Dec 2017)	10-year average (time series data from 2008-09 to 2017-18 ²)
		Productivity of trawl (otter) fisheries		
Productivity of pot fisheries				
Economic stimulus	Employment	Gladstone LGA unemployment data (2018 March quarter)	Australian Department of Employment, <i>Small Area Labour Markets</i>	Queensland 2018 distribution (March quarter)
	Socio-economic status	Index of economic resources derived from 2016 ABS census and updated using the community CATI survey	CATI survey; Australian Bureau of Statistics, 2016 census + ABS (2018)	Australian 2016 distribution
Economic value (Recreation)	Land-based recreation	Land-based recreation satisfaction + economic value	<i>Satisfaction</i> : CATI survey + economic value (Pascoe et al. 2014)	10 point scale
	Recreational fishing	Recreational fishing satisfaction + economic value	<i>Satisfaction</i> : CATI survey + economic value (Cannard et al. 2015)	10 point scale
	Beach recreation	Beach recreation satisfaction + economic value	<i>Satisfaction</i> : CATI survey + economic value (Pascoe et al. 2014)	10 point scale
	Water-based recreation	Water-based recreation satisfaction + economic value	<i>Satisfaction</i> : CATI survey + economic value (Windle et al. 2017)	10 point scale

¹ This information is no longer available and a new source will be required for the 2019 report card (see Recommendation 1)

² At the time of reporting data for all months in the 2017-18 financial year were incomplete and three months data for April to June 2018 were still unavailable as outlined in Section 2.4 below.

Table 4: Details of 2018 modifications to data analysis

Assessment criteria	Action	Rationale	Impact
<i>Economic performance</i> Indicator: Commercial fishing Measure: Line fishing	Removed from assessment	Recommendation 2a from 2017 report.	Low. The sector represents only 1-2% of total production. Data has missing values.
<i>Economic Stimulus</i> Indicator: Socio-economic status Measure: Index of Economic resources	Assessment details updated with 2016 ABS Census information. Details in methods section	Baseline information updated	Low. The socio-economic status of Gladstone continues to decline
<i>Economic value (recreation)</i> Indicator/measure Water-based recreation (non-fishing)	Included as an additional 4 th indicator/ measure of recreational activity The social indicator measure 'Satisfaction with recreation trip' amended to include 4 types of activity.	Recommendation 4 from 2017 report	Low: Score based on satisfaction and economic value. These are not expected to vary significantly from the other activities.
<i>Liveability and wellbeing (Social)</i> Measure: Aesthetic value	Included as an additional 3rd measure. Assessed as the avg score for 2 new CATI qus. 'I enjoy going to the harbour because it is beautiful to look at' (Q45a). 'I enjoy going to the harbour because of its natural beauty' (Q45b). <i>Weighting:</i> same weight as the first measure 'Makes living in Gladstone a better experience' (Q45).	Recommendation 3 from 2017 report	Medium/high: Likely to increase the score as the relative importance of aesthetic values are high.

2.2 Weightings and aggregation for indicator groups, indicators and measures

Combining the different elements within a grouping requires some assumption about the relative importance of those elements. In this project it is assumed that the importance of elements varies, and a system of weightings is applied in the aggregation process. Each element is weighted to reflect its relative importance as a management objective. This means each measure is weighted and the weighting combinations of measures are unique to each indicator. It is the combination of the measures for each indicator that reflects the grade and not an average of the measure scores. The same applies in terms of weightings for the elements at other higher levels of aggregation.

The relative weights were derived from the opinions of both the community and experts with information collected in 2014 (Pascoe et al. 2014). The opinions of the two groups were very similar. Three different surveys were conducted with:

- Management experts (those with a management or industry role) (n=31): respondents provided weightings for the different **indicator groups** in all three components

- Community members (n=83): respondents provided weightings for the different **indicator groups** in all three components
- Technical experts (marine or coastal-social scientists) (n=19): respondents provided weightings for the **social and cultural indicator groups, indicators and measures**.

Three commonly used approaches to determine weights were trialled: simple ranking approaches, scoring based approaches and the Analytic Hierarchy Process based on a series of pair-wise comparisons. The weights derived from the scoring approach were applied as they had the lowest variance (Pascoe et al. 2014).

In the Economic component, no external information was collected to inform the weightings for the economic indicators/measures. Weights were determined through a combination of impact weighting and subjective (expert) assessment for the indicator groups.

To aggregate the scores for the measures into indicator scores, indicator groups and components, a Bayesian Belief Network (BBN) approach is applied. This model is able to provide a probability of an outcome rather than a deterministic outcome. From the conditional probability distributions, a mean (expected) outcome and confidence interval can be determined. In other words, a score is not estimated and then a weighting applied as in a deterministic approach. The numerical score for the report card is based on the weighted average of the A-E values in the distribution of outcomes. For example, in 2014 the 'Sense of place' cultural indicator group scored 0.64 based on a 2.1% probability it would score an A, a 67.7% likelihood that it would score a B, a 29.5% likelihood it would score a C, and a 0.7% chance of a D (Pascoe et al. 2014: Figure 82).

This means that a table of the specific weights applied cannot be produced and the conditional probability tables are too unwieldy to report as there are A^x rows associated with each level of aggregation, where A represents the number of grades (5) and x represent the number of elements. For example, the probability tables for the indicator groups in both the Social and Economic components would comprise of 125 rows as each has five grades and three elements (indicator groups).

2.3 Primary data collection

Primary data are collected directly from the Gladstone community in an annual questionnaire survey. In 2018, the CATI survey was conducted with residents in the first two weeks of June and 400 responses were collected. There were no notable events that may have influenced the opinions of local residents during the survey period. The survey included questions related to the GHHP social, cultural and economic objectives which were designed to be answered on a 10-point agree-disagree scale to produce quantifiable results.

Information collected in the CATI survey is primarily applied to calculate the baseline scores for the social indicator measures (apart from two measures of harbour safety), and cultural ('Sense of place') measures. Some additional information is collected and applied to assess economic indicators relating to recreation values and socio-economic status (see Table 3).

2.4 Secondary data sources

In the Economic component of the report card, secondary data sources are applied to assess the scores for the indicators in the 'Economic performance' and 'Economic stimulus' indicator groups. Information is also collected about some harbour safety measures ('Marine safety incidents' and 'Oil spills') in the Social component. Details are outlined in Table 3.

2.4.1 Economic performance

The 'Economic performance' indicator group consists of three indicators ('Shipping activity', 'Tourism' and 'Commercial fishing'), which represent the key industries using the harbour. The relative contributions to revenue share across the three activities are applied as impact weightings.

Shipping

Data on monthly shipping movements by cargo type is sourced from the Gladstone Ports Corporation and a 10-year data array is analysed. A capacity utilisation approach (current level of activity relative to potential level of activity) is applied and the report card score is estimated through data envelopment analysis with details provided in Pascoe et al. (2014).

Tourism

Tourism expenditure is applied as a measure for the 'Tourism' indicator. A standard 10-year data array is used in the analysis. Data are updated annually from information provided on the Gladstone Regional Council website (www.economicprofile.com.au/gladstone/tourism/output) which is sourced from REMPLAN a consultancy group who estimate the output from tourism using input/output analysis. The latest estimate relates to the 2016-17 financial year.

An additional value estimate is included to account for expenditure from cruise ships. Six cruise ships visited Gladstone in 2016-17 and information about tourism expenditure from these cruise ships (passengers and crew) has been sourced from an AEC consultancy report (AEC 2016) and included in the total estimate of tourism expenditure.

Commercial fishing

The assessment for 'Commercial fishing' is based on both reported catch data (kgs) and fishing effort (# licences and # days fished). Data is sourced from the QFish database through the Queensland Department of Agriculture and Fisheries. Information is applied from three fisheries sectors: net (fish), otter trawl (prawn) and pot (mud crab), with each assessed as a separate measure for the indicator. A standard 10-year data array is analysed with production data updated for 2017-18. Additional information about the average price for fish, prawns and crabs is derived from ABARES fisheries statistics, with updated information for 2016 sourced from Mobsby & Koduah (2017: p 102, Table S9).

Production data are collected primarily from Grid area S30 which covers Gladstone Harbour and the open coastal waters immediately adjacent to the harbour. However, the harbour area only captures part of the total activity of the Gladstone commercial fishing fleet and information is also included from the waters adjacent to Mackay (grid area O25) and Rockhampton/Yeppoon (grid area R29). Including these areas also helps control for spatial differences in catch across years as they provide more balanced information on fishing productivity in that region.

A capacity utilisation approach is applied and the measures of relative productivity are estimated using data envelope analysis.

The three different fisheries/measures are weighted by their relative contribution to the gross value of production (GVP).

There is an ongoing issue of incomplete data in the QFish datasets. Information applied for analysis relates to the financial year. However, at the time of reporting (July) the QFish records for all months in the 2017-18 reporting period were still incomplete and data for the last three months (April-June) were unavailable (as was the case last year for the 2017 report). To maintain consistency with previous reports, the score was calculated without the missing data and no other data was substituted in its place.

In order to retain consistency in the reporting period for the three indicators in the group, a 2017 recommendation to change the reporting period from the financial year to the calendar year was not accepted. This recommendation has been restated in this report (Recommendation 3) because the impact of the missing data is easily overlooked. Additional information is also provided to highlight the differences in production data across the two reporting periods.

2.4.2 Economic stimulus

The 'Economic stimulus' indicator group consists of two indicators: 'Employment' and 'Socio-economic status'.

The score for 'Employment' is based on unemployment statistics for the Gladstone Local Government Area (LGA) provided by the Australian Bureau of Statistics (ABS) via the Queensland Government Statistician's Office. The most recent data available for this report are for the March 2018 quarter. Unemployment in the Gladstone LGA is compared with unemployment rates in all Queensland LGAs.

The score for 'Socio-economic status' is derived using an economic measure known as the Index of Economic Resources (IER) which is a composite measure of the economic wellbeing of a community focusing on variables such as income, housing expenditure and ownership, cost of living and assets of households.

The 'Socio-economic status' indicator is afforded a slightly higher weighting than Employment (55:45) as it includes more variables.

Index of Economic Resources (IER)

The IER is formally calculated by the ABS using a system of weightings applied to the 14 nominated variables. The index is adjusted for the Gladstone region, and updated annually, by applying information collected in the CATI survey. In all previous report cards, the IER for Gladstone has been based on the ABS weightings established from 2011 census data.

In 2018 the ABS released the updated loadings and descriptions for the composite variables based on the 2016 Census data (Table 5) which are now applied to estimate the IER for Gladstone. The relative decline in socio-economic status in Gladstone between the 2011 census and 2016 census is evident. The ABS estimated the IER score for Gladstone from the 2011 census data as 1040 which placed it in the 9th decile in the distribution of LGAs in Australia. In 2016, the IER was estimated at 994, placing it in the 7th decile (ABS 2018).

Table 5: 2016 Census revised IER variable descriptions and loadings

Variable	2011 Variable description <i>Source: Pink 2013</i>	2011 Loading	2016 Variable <i>Source: ABS 2018</i>	2016 Loading
INC_LOW	% People with stated annual household equivalised income between \$1 and \$20,799 (approx. 1st and 2nd deciles) (disadvantage)	-0.79	income between \$1 and \$25,999	-0.77
INC_HIGH	% People with stated annual household equivalised income greater than \$52,000 (approx. 9th and 10th deciles) (advantage)	0.63	income greater than \$78,000	0.55
UNEMP_RATIO	% People aged 15 and over who are unemployed (dis)	0.57	same	0.54
UNINCORP	% Occupied private dwellings with at least one person who is an owner of an unincorporated enterprise (adv)	0.49	same	0.52
OWNING	% Occupied private dwellings owning the dwelling they occupy (without a mortgage) (adv)	0.33	same	0.36
MORTGAGE	% Occupied private dwellings owning the dwelling they occupy (with a mortgage) (adv)	0.66	same	0.67
HIGHMORTGAGE	% Occupied private dwellings paying more than \$2,800 per month in mortgage repayments (adv)	0.67	same	0.68
LOWRENT	% Occupied private dwellings paying less than \$166 per week in rent (excluding \$0 per week) (dis)	-0.72	rent less than \$215 per week	-0.72
GROUP	% Occupied private dwellings who are group occupied private dwellings	-0.31	same	-0.37
LONE	% Occupied private dwellings who are lone person occupied private dwellings	-0.66	same	0.66
OVERCROWD	% Occupied private dwellings requiring one or more extra bedrooms (based on Canadian National Occupancy Standard)	-0.54	same	-0.51
HIGHBED	% Occupied private dwellings with four or more bedrooms (adv)	0.74	same	0.74
ONEPARENT	% Families that are one parent families with dependent offspring only (dis)	-0.66	same	-0.63
NOCAR	% Occupied private dwellings with no cars (dis)	-0.77	same	-0.73

2.4.3 Harbour usability

The social indicator 'Perceptions of harbour safety for human use' ('Harbour usability' group) includes two measures ('Marine safety incidents' and 'Oil spills') which are assessed from secondary data sourced from Queensland Department of Transport and Main Roads. In the initial 2014 pilot report, the number of both domestic and commercial vessels were combined to determine the incident rate. However, new regulations have meant jurisdictional changes and since 2014

Queensland reporting only includes information on *Queensland regulated ships* (99.8 % recreational vessels) and not commercial vessels.

2.5 Valuation of recreational activity

One of the three economic indicator groups to be assessed in the GHHP report card is 'Economic value (recreation)'. There are two components of value that can be assessed. The first is the commercial value of recreation and tourism, with both direct use and indirect use values. These values can be determined from financial records of commercial tourist operators and are assessed as part of the 'Economic performance' indicator ('Tourism expenditure'). The second type of recreation value is classified as non-market value. This is the value associated with local residents who use the harbour area for recreational purposes but their activity is not reflected in the financial records of commercial service providers. Economists refer to this as non-market value because they are not captured in formal market estimates. Non-market values for recreation comprise both use and non-use values. The latter relates to economic values held by people who might not currently use the harbour for recreation but might wish to do so in the future or they might value the fact that other people can use it.

A section of the CATI survey focuses on collecting information to estimate the non-market values of recreation. While it is possible to assess both use and non-use recreation values in a community survey, practical limitations restricted the focus to use values only. The Travel Cost Method (TCM) was applied as the valuation format, with full details provided in Pascoe et al. (2014).

Four types of recreational activity are assessed and based on recommendations in the 2014 pilot report card (Pascoe et al. 2014), the recreational trip values only require updating every five years. In 2014 the economic value of a recreational trip was estimated for beach recreation (\$40 per trip) and other land-based recreation (\$61 per trip). In 2015, supplementary information was collected to provide a value estimate for recreational fishing (\$143 per trip). In 2017, information was collected to provide a value estimate for other (non-fishing) water-based recreation (\$95 per trip).

Two factors are included in the calculation of the report card score for each of the four recreational activity indicators: the economic value of the recreational activity and the quality of the recreational experience. The value of a recreational trip has been established and the economic value of the activity is updated annually based on changes in participation frequency rates (collected in the CATI survey). Details about trip satisfaction for the four types of activity are also collected in the CATI survey.

The scores for the four types of recreational activity are based on the satisfaction ratings for each activity which are then weighted by their relative contribution to the economic value of recreation (value of a recreation trip multiplied by the participation frequency rate).

2.6 Reporting zones

The Gladstone Local Government area (LGA) was used as the broader geographic scope for the collection of social, cultural and economic data. However, slightly different geographic boundaries within the broader Gladstone LGA were used for some primary and secondary data as outlined below.

- **Shipping data:** is limited to the Port of Gladstone.
- **Commercial fishing data:** involves the Gladstone Harbour area (Grid S30) and the nearby open coastal waters of Mackay (Grid O25) and Rockhampton/Yeppoon (Grid R29).

while the remaining sections address the specific results of the Social, Cultural and Economic components.

3.1 Key demographics of the CATI community survey respondents

A total of 400 responses were collected in June for the 2018 CATI survey. The majority of respondents (90%) were recruited through mobile phones and 10% through landlines. The increased use of recruitment through mobiles (58% in 2017) has improved the age profile of the sample with better representation from the younger age groups (Table 6). However, representation from those over 65 years has fallen although the proportion of the sample over 55 years (31.3%) does match the population (29%). Gender is a segmentation criteria in the survey and is controlled to ensure equal representation. The household income distribution of the sample is well aligned with the population as is the proportion with a post school education. However the proportion of the sample with a tertiary education (24%) remains significantly higher than the population (14%).

Table 6: Demographic details of survey respondents and comparison with previous years

% respondents	CATI survey 2018	CATI survey 2017	ABS Census (2016)
Gender			
% male	50%	50%	51%
Age category			
18-24 yrs	7.0%*	4%*	11%
25-34 yrs	18.8%	15%*	19%
35-44 yrs	20.5%	24%	20%
45-54 yrs	22.5%	21%	21%
55-64 yrs	21.3%*	20%	16%
65+ yrs	10.0%*	16%	13%
Annual household income		Different categories	
Less than \$25,999	9.8%		8%
\$26,000 – \$51,999	12.2%*		18%
\$52,000 – \$77,999	12.7%		14%
\$78,000 – \$103,999	17.6%*		12%
\$104,000 – \$129,999	15.5%		15%
\$130,000 – \$181,999	16.6%		17%
Greater than \$182,000	15.5%		16%
Education			
Post school qualification	53%	53%	56%
Tertiary level	24%*	25%*	14%

* Binomial tests indicate a significant difference from the survey population

Most survey respondents were long term residents and had lived in the area for an average of 20 years, but less than the 2017 average (24 years). The residency profile of respondents continues to change compared to the 2014 baseline (Figure 3) and may in part be related to the increased representation of younger residents.

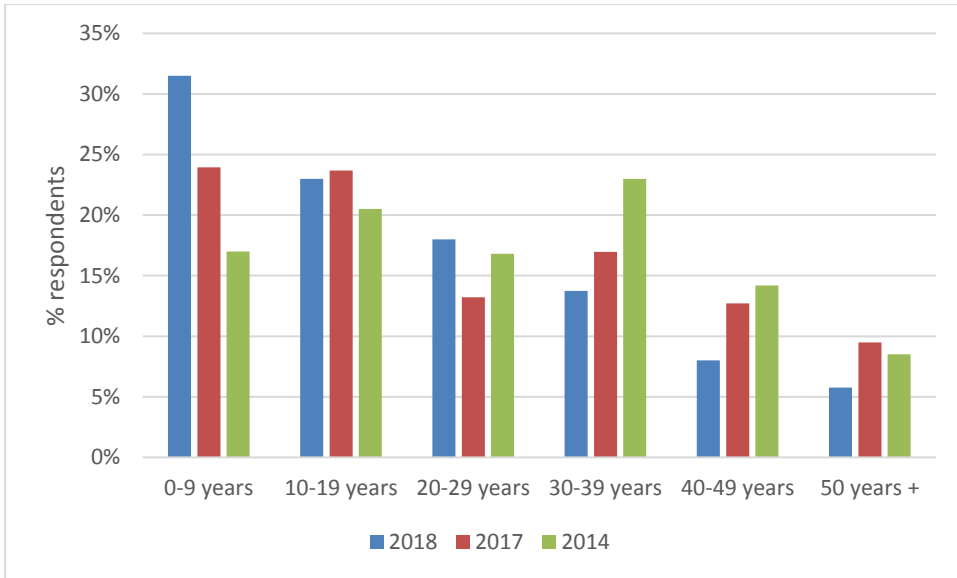


Figure 3: Length of residency in the Gladstone region

The majority of respondents own their homes without a mortgage (27%) or with a mortgage (43%), while 30% are renting. The proportion of rentals continues to increase (22% in 2017; 14% in 2014).

Ten percent of participants identified themselves as Traditional Owners of the area which is a decline from 13% last year but still higher than the population of 4% Indigenous residents (ABS 2016 Census).

Usage of the harbour for recreation remains very high but has fallen slightly from last year but not from the 2014 baseline. Boat ownership has also fallen slightly but usage of boat ramps has remained steady (Figure 4).

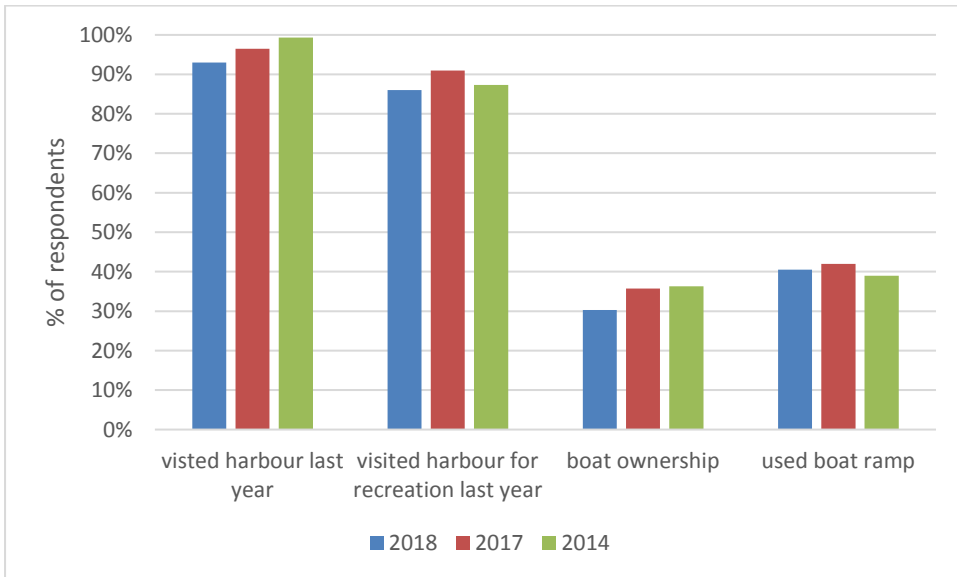


Figure 4: Recreational use of the harbour

3.2 Word cloud results

Word clouds enable the visual identification of key recurring issues or themes in an area. At the start of the CATI survey participants were asked “when you think of the Gladstone Harbour area, what are

the first three words that come to mind?” These words were analysed using the web-based application *Wordle* (www.wordle.net) to produce the word clouds. This analysis gives greater prominence to words that appear more frequently.

The word cloud produced and shown in Figure 5 is based on the first word provided by respondents. The results highlight the primary importance of ‘Fishing’ as the most frequently mentioned first word, followed by ‘Beautiful’. The industrial nature of the harbour is well recognised and it is seen as a ‘Busy’ place with prominence given to commercial and recreational traffic (Boats, Ships). Positive associations with the harbour (Pretty, Clean, Nice, Great, Good) are more prevalent than negative associations (Polluted, Dirty).



Figure 5: Word cloud for first word response from survey respondents (size indicates frequency)

The word cloud produced from the combination of the first three words provided by respondents is shown in Figure 6. When all three words are compiled, other features of the harbour-become more prominent (Islands, Dolphins). However, the same key elements dominate the word cloud as featured in the first-word cloud above. ‘Fishing’ remains dominant, followed by ‘Industrial’ and ‘Beautiful’ as well as the associated activity of a ‘Busy’ industrial harbour that provides many recreational opportunities and community benefits.



Figure 6: Word cloud for all three word responses (size indicates frequency)

The importance of fishing is incorporated in the report card in terms of the economic value of both commercial and recreational fishing. The importance of industrial activity is incorporated in the report card as an indicator of economic performance. The natural beauty of the harbour is assessed for the first time in 2018 as a measure of aesthetic value for the social indicator 'Liveability and wellbeing'.

3.3 Recreational activity and valuation update

A section of the CATI survey is designed to collect information about recreational activity which is applied to estimate the scores and grades for the 'Economic (recreational) value' indicator group in the Economic component of the report card. Four types of recreational activity (beach, land-based, fishing and water-based recreation) are assessed as separate indicators. The report card scores for the four recreational indicators are based on the satisfaction ratings for the last recreational trip undertaken for each activity in the past year. These ratings are then weighted by the relative economic value of the activity to determine the scores and grades for the report card. A full analysis of the results is provided in Appendix D with summary information presented below.

A total of 400 responses were collected in the 2018 Gladstone CATI survey. Nearly all respondents (93%) had visited the Gladstone Harbour area in the last 12 months (a decrease of 3.5% from last year), and 343 respondents (86%) had visited the harbour for recreational purposes (a 5% decrease from last year).

The majority of respondents (68.5%) indicated that their recreational use of the harbour had not changed in the last 12 months, but more people reported increased use (19% [1% less than 2017]) than decreased use (13% [2% less than 2017]).

Beach and land-based recreational activity were much more prevalent than recreational fishing and other water-based recreation. Ninety-three per cent of respondents had participated in beach and 88% in land-based recreation, while 41% had participated in recreational fishing and 47% in other water-based recreation. In the past 12 months there had been an increase in beach, fishing and water recreation (91%, 44% and 40% in 2017 respectively), with a decline in land recreation (92% in 2017).

Just under a third of respondents (30.3%) indicated they owned a boat (35.7% in 2017). In the last 12 months, 162 (40%) respondents had used a boat ramp for an average of 22 times (average of 9 times for the whole sample). There has been little change in use of boat ramps from previous years.

3.3.1 Satisfaction rating scores

Information about the level of satisfaction with each of the recreational activities is derived from the CATI survey, based on a 10-point satisfaction scale. Overall, respondents reported high levels of satisfaction with all types of recreational activity in the harbour area with mean scores of 8.22, 8.26, 7.36 and 8.13 for beach, land-based, fishing and water-based recreation respectively. There has been no statistically significant (Independent Samples T-test at 5%) change from 2017 for any activity.

3.3.2 Annual economic value of recreational activity

The annual economic value of the four types of recreational activity is estimated from the information collected about trip frequency (this survey) and the trip values which have already been

established² in 2014 for beach and land-based recreation at \$40 per trip and \$60 per trip respectively (Pascoe et al. 2014) and in 2015 for recreational fishing at \$143 per trip (Cannard et al. 2015) and in 2017 for other (non-fishing) water-based recreation at \$95 per trip (Windle et al. 2017).

In 2018 there has been some change in participation frequency for certain activities. As mentioned above, participation rates have increased for beach, fishing and water recreation but declined for land-based recreation. However, participation frequency amongst users has increased in the past year for all four activities with significant (Independent Samples T-test at 5%) increases for fishing recreation ($p=0.029$). Full sample participation frequency has also increased for all four activities, including land-based recreation despite the drop in participation rate. Full sample participation frequency has significantly increased for beach and fishing recreation ($p=0.049$ and 0.017 respectively).

- **Beach recreation: Avg trips/yr**
2018: users (n=371) = 39.35; full sample (n=400) = 36.49
2017: users (n=366) = 32.17; full sample (n=401) = 29.36
- **Other land-based recreation: Avg trips/yr**
2018: users (n=351) = 42.97; full sample (n=400) = 37.71
2017: users (n=368) = 38.20; full sample (n=401) = 35.06
- **Fishing recreation: Avg trips/yr**
2018: users (n=164) = 24.49; full sample (n=400) = 10.04
2017: users (n=175) = 15.66; full sample (n=401) = 6.84
- **Other water-based recreation: Avg trips/yr**
2018: users (n=189) = 20.01; full sample (n=400) = 9.45
2017: users (n=161) = 14.91; full sample (n=401) = 5.99

The overall value of recreation to the Gladstone community can be estimated by extrapolating information from the survey sample to the Gladstone population. Details are provided in Appendix D2. Although the population of Gladstone had fallen slightly from 63,288 in 2015-16³ to 63,052 in 2016-17 this was overridden by the increases in participation frequency noted above.

The average annual value of recreational trips for 2018 is:

- \$34.99 million for beach recreation (\$28.21 million in 2017)
- \$51.09 million for land-based recreation (\$47.60 million in 2017)
- \$31.19 million for recreational fishing (\$21.35 million in 2017)
- \$20.23 million for water-based recreation (\$13.34 million in 2017)

3.4 Social component results

The overall grade for the Social component is a B (score of 0.67) which is a small improvement from last year (0.66) but represents a strong improvement since 2014 (0.58).

The Social component is assessed through three social indicator groups ('Harbour usability', 'Harbour access' and 'Liveability and wellbeing') and their associated indicators. In total there are eight indicators and 23 measures applied to determine the scores and grades for the three indicator groups (Table 7).

² The travel cost recreation value estimates for the different activities remain constant for a five year period before an update is recommended (Pascoe et al. 2014).

³ In the 2017 report the Gladstone population was estimated at 67,426 but the source has changed and population data is now sourced from the more reliable ABS Cat #3218.0)

Table 7: Summary of grades and scores for the Social component

Social component: 2018 = 0.67 (B) 2017 = 0.66 (B); 2014 = 0.58 (C)									
Indicator Group	Score	Indicators	Score			Measures	Score		
			2018	2017	2014		2018	2017	2014
Harbour usability	0.63 C 2017: 0.62 2014: 0.60	Satisfaction with harbour recreational activities	0.70	0.69	0.70	How satisfied last recreational trip	0.71	0.70	0.74
						Quality of ramps and facilities	0.68	0.68	0.63
		Perceptions of air and water quality	0.58	0.56	0.46	Water quality (WQ) satisfaction	0.61	0.58	0.39
						Air quality satisfaction	0.47	0.47	0.40
						WQ does not affect harbour use	0.66	0.64	0.58
		Perceptions of harbour safety for human use	0.61	0.60	0.38	Marine safety incidents	0.54	0.76	0.24
						Oil spills	0.56	0.38	0.15
						Safety at night	0.65	0.64	0.58
						Happy to eat seafood	0.67	0.64	0.55
		Harbour access	0.67 B 2017: 0.66 2014: 0.61	Satisfaction with access to the harbour	0.72	0.72	0.67	Fair access to harbour	0.72
Satisfaction with boat ramps + public spaces	0.66			0.65	0.60	Frequency of use	0.51	0.51	0.46
						Number of boat ramps	0.72	0.69	0.65
						Access to public spaces	0.75	0.72	0.68
Perceptions of harbour health	0.63			0.63	0.53	Great condition	0.66	0.66	0.54
						Optimistic about future health	0.64	0.61	0.56
						Improved over the last 12 months	0.60	0.60	0.50
Perceptions of barriers to access <i>(Note: scores are reversed. A higher score denotes a decrease in the barrier)</i>	0.65			0.65	0.64	Marine debris a problem	0.50	0.50	0.51
						Marine debris affects access	0.72	0.72	0.70
						Shipping reduced my use	0.67	0.70	0.63
		Recreation boats reduced my use	0.67			0.67	0.69		
Liveability wellbeing	0.70 2017: 0.66 2014: 0.64	Liveability and wellbeing	0.70	0.66	0.64	Makes living in Gladstone a better experience	0.77	0.74	0.71
						Participate in community events	0.52	0.54	0.53
						Aesthetic value	0.75	na	na

The measures to construct most of the social indicator scores were assessed from information collected in the CATI survey based on participants' satisfaction or agreement ratings using a 10-point Likert scale. The distribution of the 10-point scale was applied as the baseline for all measures, except for 'Oil spills' and 'Marine safety incidents' where secondary data was applied (Table 1). Full details of the CATI survey results (unweighted scores) are provided in Appendix C.

The weighting for the social indicators and measures were derived from the 2014 survey of Technical experts. Aggregation weighting for the indicators groups were derived from the Management experts, Technical experts and Community surveys.

In the past 12 months there has only been a one point change in the scores for the 'Harbour access' and 'Harbour usability' indicator groups. More improvement (4 points) is evident in the 'Liveability and wellbeing' group which for the first time includes a third measure 'Aesthetic value'.

The scores for all the indicators and measures are reported in Table 7 and summary comments are made in the subsections below.

3.4.1 Harbour usability

The 'Harbour usability' indicator group was assessed as a C-grade (score of 0.63), a small improvement from last year (0.62) and from 2014 (0.60). This indicator group includes three indicators with little change in scores over the last year. However, while the overall score for the 'Harbour safety' indicator has only changed by one point, there have been notable changes in scores for two measures. 'Marine safety incidents' records a 22 point decrease which is offset by an 18 point increase in the score for 'Oil spills'.

Satisfaction with recreational activities

The indicator 'Satisfaction with recreational activities' scored 0.70, a small increase compared with 0.69 in 2017 but with no change from the 2014 score of 0.70.

There are two measures for this indicator. The first measure, 'How satisfied with last recreational trip' (average across the four types of recreational activity [beach, land, fishing and water]) has a score of 0.71 and the second measure 'Quality of ramps and facilities (associated with boat ramps)' has a score of 0.68.

Perceptions of air and water quality

The indicator 'Perceptions of air and water quality' has a score of 0.58 which is a slight increase from 2017 (0.56) and a more substantial increase from 2014 (0.46). As in previous years, the measure assessing perceptions of air quality has the lowest score, but it has not changed in the last year. There has been a small improvement in perceptions about water quality and the impact it has on harbour use.

- 'Water quality satisfaction' (Q40.I think water quality in Gladstone Harbour is in good condition) has increased from 0.58 in 2017 to 0.61 in 2018.
- 'Air quality satisfaction' (Q41.I think air quality in Gladstone Harbour is in good condition) remains stable at 0.47 in 2017 and 2018.
- 'Water quality does not affect harbour use' (Q42.The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months) has increased from 0.64 in 2017 to 0.66 in 2018.

Perceptions of harbour safety for human usage

The indicator ‘Perception of harbour safety for human use’ received a score of 0.61, which represents a slight increase from 2017 (0.60) but still a major improvement from 2014 (0.38)⁴.

The scores reflecting concerns about personal safety at night and about eating seafood have improved from last year with a stronger improvement in the latter (0.67 vs 0.64 in 2017) and a slight change in personal safety (0.65 vs 0.64 in 2017).

The main changes in the score for the indicator relate to a strong decrease in the score for the measure ‘Marine safety incidents’ (0.54 vs 0.76 in 2017) and a strong improvement in the score for the ‘Oils spills’ (0.56 vs 0.38 in 2017). Information about these two measures comes from secondary source data.

There were 72 reported marine incidents and an incident rate of 15.04 (per 10,000 *Qld regulated ships* [99.8% recreational vessels]) in the Gladstone maritime region in 2017. This represents an increase from the previous year with 64 incidents and an incident rate of 13. The distribution of marine safety incidents across the 10-year array in Queensland is provided in Figure 7. The Gladstone incident rate of 15.04 falls in the 46th percentile, but as higher levels are less desirable this value is reversed to determine the score for the report card (i.e. 1-0.46 = 0.54).

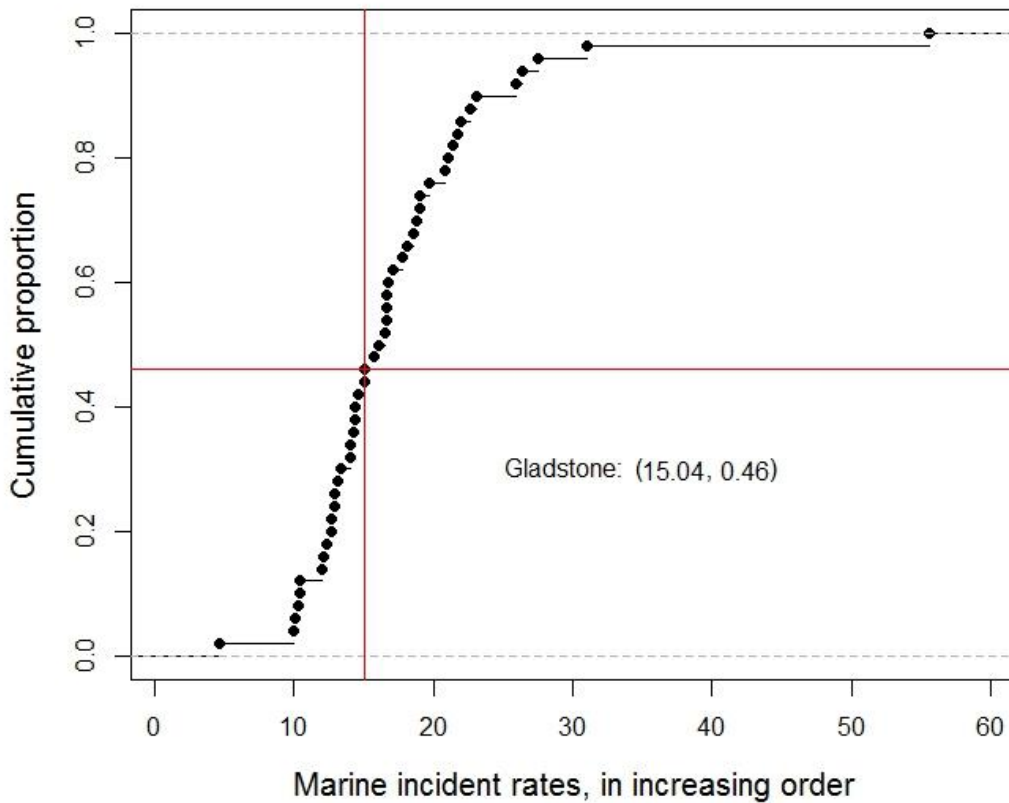


Figure 7: Distribution of marine safety incidents for Queensland

⁴ The low score for the indicator in 2014 is driven by very low scores (E grade) for the Marine incidents and Oil spill measures (scores of 0.24 and 0.15 respectively). New jurisdictional changes have meant that since 2014 information to estimate incident rates is only available for Queensland recreational vessels and does not include commercial vessels as occurred in 2014. This was noted in 2016.

In 2017 there were 11 oil spills reported in the Gladstone maritime region, less than the 18 reported last year for 2016, with a corresponding decrease in the incident rate from 3.76 in 2016 to 2.30 in 2017. However, only 45% of the 2017 spills occurred in the Gladstone Harbour area⁵. The distribution of oil spills across the 10-year array in Queensland is provided in Figure 8. The incident rate of 2.30 falls in the 44th percentile, but as higher levels are less desirable this value is reversed to determine the score for the report card (i.e. $1 - 0.44 = 0.56$).

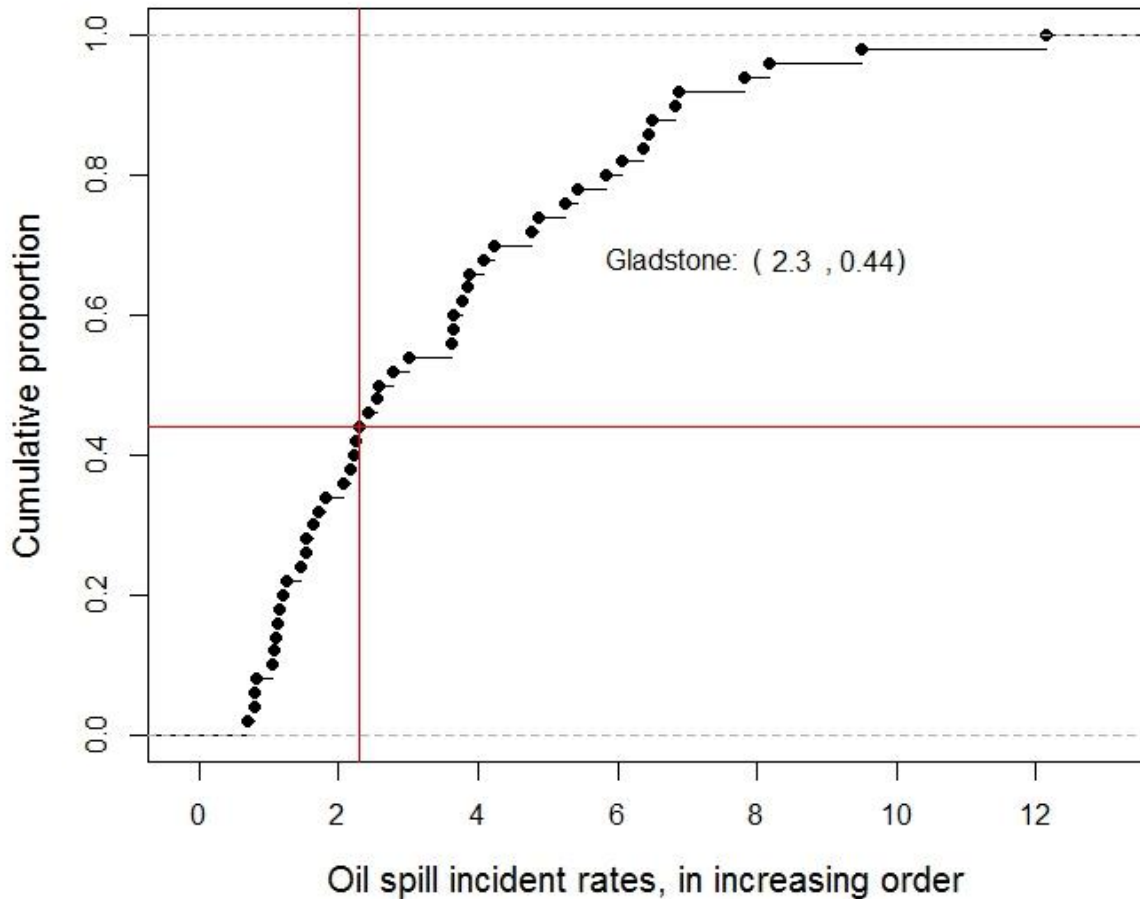


Figure 8: Distribution of oil spills for Queensland

3.4.2 Harbour access

The ‘Harbour access’ indicator group was assessed as a B-grade and a score of 0.67 with a one point increase from last year (0.66) but more improvement from 2014 (0.61). This indicator group includes four indicators with relatively even scores contributing to the overall group score.

Satisfaction with access to the harbour

The indicator ‘Satisfaction with access to the harbour’ scored 0.72, with no change from last year but an improvement from 0.67 in 2014. The one measure refers to Q29 in the CATI survey (Q.29.I have fair access to Gladstone Harbour compared to other users of the harbour).

⁵ Incidents outside the Gladstone Harbour area were not removed to retain consistency with prior methodology.

Satisfaction with boat ramps and public spaces

The indicator 'Satisfaction with boat ramps and public spaces' scored 0.66, a one point improvement from last year and stronger improvement from 0.60 in 2014. While the measures 'Number of ramps' and 'Access to public spaces' have good and improved scores (0.72 and 0.75 respectively; 0.69 and 0.72 in 2017) the score for the indicator is reduced by the lower score for 'Frequency of use' (0.51) but remains unchanged from 2017. However, most people do not own a boat (70%) or use a boat ramp (59%) as reported in Section 3.1.

Perceptions of harbour health

The indicator 'Perceptions of harbour health' scored 0.63, with no change from last year but an improvement from 0.53 in 2014. In the last 12 months, there has been no change in the scores for two measures but a three point improvements for the third measure ('Optimistic about future health') (Table 7).

Perceptions of barriers to access

The indicator 'Perceptions of barriers to access' scored 0.65, with no change from 2017 and only a one point improvement since 2014. Three out of four measures score well (>0.67) suggesting that marine debris did not adversely impact on harbour access and, shipping and boating activity did not adversely impact on harbour use. The overall score was reduced by the low score for the 'Problem of marine debris' (0.50). In previous years, shipping has had a greater impact on recreational use of the harbour than recreational boats, but this year they receive the same score.

3.4.3 Liveability and wellbeing

The 'Liveability and wellbeing' indicator group was assessed as being B-grade (score of 0.70) which represents a four point increase from 2016, and six points from 0.64 in 2014.

There is only one indicator in this group and the increase in score is partly due to the inclusion of an extra measure for the indicator to assess the benefit of aesthetic values of the harbour as well as an increase in score for one of the existing measures.

The overall score for this indicator is typically influenced by a high score for the measure 'Makes living in Gladstone a better experience' (Q45. Gladstone Harbour makes living in Gladstone a better experience) (0.77 in 2018; 0.74 in 2017) and a lower score for the measure 'Participate in community event' (Q46. I rarely participate in community events in the Gladstone Harbour area) (0.52 in 2018; 0.54 in 2017). This year the score for 'better living' increased by three points while the offsetting score for the measure 'participation in community events' fell by two points.

The third new measure 'Aesthetic value' (Q45a. I enjoy going to the Harbour because it is beautiful to look at and Q45b. I enjoy going to the Harbour because of its natural beauty) received a relatively high score of 0.75 which further offsets the lower score of the measure 'participation in community events'.

3.4.4 Social component summary

The overall grade for the Social component is a B (score of 0.67) which represents little change from last year (0.66) but a strong improvement since 2014 (0.58).

There has been little change (two points at most) in the scores for the 'Harbour access' and 'Harbour usability' indicator groups or associated indicators. The 'Liveability and wellbeing' indicator group/indicator has improved its score partly as a result of the inclusion of a new measure 'Aesthetic value' and partly from an increase (three point) in the score for the measure 'Makes living in Gladstone a better experience'.

There has been a considerable decrease in the score for 'Marine safety incidents' and increase in the score for 'Oil spills' ('Harbour usability'). The unbalanced influence of these two secondary source measures in the indicator 'Perceptions of harbour safety' is evident. A relatively small change in the raw data (incident rate) for either measure translates into a bigger change in score compared to the measures assessed from primary source (CATI survey) data. The two measures are not an accurate reflection of incidents in Gladstone harbour as the source data covers a broader regional area. In addition, neither are an effective measure of community perceptions as the indicator suggests. It is recommended that further consideration be given to the 2017 recommendation to remove these two measures (which was not accepted) as concerns remain about their suitability.

3.5 Cultural 'Sense of place' indicator group

The overall grade for the cultural 'Sense of place' indicator group is a B Grade (score of 0.65) with little change from previous years (0.65 in 2017 and 0.64 in 2014). The scores for all the indicators and measures are reported in Table 8 and summary comments are made in the subsections below.

Table 8: Summary of grades and cores for the 'Sense of place' indicator group

Indicator group Score/grade	Indicators	Score			Measures	Score		
		2018	2017	2014		2018	2017	2014
Sense of place 0.65 B 2017: 0.65 2014: 0.64	Distinctiveness	0.56	0.57	0.55	No place better	0.51	0.51	0.49
					Who I am	0.61	0.62	0.61
	Continuity	0.53	0.54	0.57	How long lived in area	0.41	0.43	0.46
					Plan to stay the next 5 years	0.65	0.64	0.68
	Self-esteem	0.74	0.72	0.69	Feel proud living in Gladstone	0.74	0.72	0.69
	Self-efficacy	0.59	0.58	0.55	Quality of life	0.65	0.67	0.64
					Input into management	0.53	0.50	0.46
	Attitudes to harbour	0.83	0.81	0.80	Key part of community	0.82	0.81	0.79
					Great asset to region	0.82	0.80	0.79
					Great asset to Queensland	0.81	0.79	0.81
	Values of harbour	0.65	0.66	0.64	Variety of marine life	0.73	0.71	0.64
					Opportunities for outdoor recreation	0.79	0.77	0.76
					Attracts visitors to the region	0.73	0.71	0.67
					Enjoy scenery and sights	0.77	0.76	0.75
					Spiritually special places	0.47	0.52	0.52
					Culturally special places	0.50	0.53	0.50
					Historical significance	0.53	0.54	0.58

The indicator group comprises six indicators and 17 measures. The baseline scores for the measures to construct the indicator scores and grades were collected in the CATI survey based on participants'

satisfaction or agreement ratings on a 10-point Likert scale. Full details of the results from the CATI survey are provided in Appendix C.

The weighting for the cultural indicators and measures were derived from the 2014 survey of Technical experts.

Statistical testing was conducted to determine whether survey responses differed between respondents who identified as a Traditional Owner of the area and the rest of the sample. There was a significant difference in the responses of Traditional Owners to five-of the 17 questions (9/17 in 2017). Three of the five differences related to the 'Values' indicator with significantly higher scores for the spiritual, cultural and historical importance questions. The other differences, with significantly lower scores, related to the 'Distinctiveness' ('no better place') and 'Attitude' ('local asset') indicators. Full details are provided in Appendix C.

While, there are relatively small annual changes in indicator scores, the 'Self-esteem' and 'Self-efficacy' indicators have recorded the largest improvements from the 2014 baseline, with the 2018 increase for 'Self-efficacy' based on an improved score for the measure 'Input into management'. The scores for the 'Continuity' indicator continue to decline as the average length of residency in the area decreases. The scores for the 'Attitudes to the harbour' indicator and associated measures remain the highest, and continue to increase over time.

3.5.1 Distinctiveness

The 'Distinctiveness' indicator scored 0.56, which represent a small one point decrease from 0.57 in 2017 and only a one point increase since 2014.

There are two measures for this indicator. The measure 'There are other places that are better than the Gladstone Harbour area for the recreational activities that I do' (Q30) scored 0.51 with no change from 2017. The other measure 'The Gladstone Harbour area is part of who I am' (Q51) scored 0.61, a one point decline from 2017. Respondents who identified as Traditional Owners were more likely to agree to question 30.

3.5.2 Continuity

The 'Continuity' indicator scored 0.53, decreasing from 0.54 and 0.57 in 2017 and 2014 respectively. There are two measures for this indicator. The 'How long lived in the area' measure (Q.3) had a low score of 0.41 which has declined from 0.43 in 2017. The average time respondents had lived in the area declined from 23.9 years in 2017 to 20.29 years in 2018. The measure is calculated by controlling for age and the low score is a reflection that many of the respondents had moved to Gladstone and had not lived there all their lives. The other measure 'Plan to stay in the next five years' (Q53) received a higher score of 0.65 representing a one point increase from 2017.

3.5.3 Self-esteem

The 'Self-esteem' indicator scored 0.74 representing a slight increase compared with 0.72 in 2017 and 0.69 in 2014. This is the only measure for the indicator and relates to Q.50 (I feel proud that I live in the Gladstone community) in the CATI survey.

3.5.4 Self-efficacy

The 'Self-efficacy' indicator scored 0.59 representing a one point increase from 2017 and an increase from 0.55 in 2014. There are two measures for this indicator. The 'Quality of life' measure (Q52. The Gladstone Harbour area improves my quality of life) scored 0.65, declining from 0.67 in 2017. The other measure, 'Input into management' (Q47. I feel able to have input into the management of the

Gladstone Harbour if I choose to) continues to receive a low score of 0.53 but has increased from 0.50 in 2017.

3.5.5 Attitudes to the harbour

The 'Attitudes to the harbour' indicator received the highest score of all indicators in this group. The 2018 score of 0.83 has increased from 0.81 in 2017 and 0.80 in 2014. There are three measures in this indicator: Q54.The Gladstone Harbour is a key part of the Gladstone community; Q58.The Gladstone Harbour area is a great asset for the economy of this region; and Q59.The Gladstone Harbour area is a great asset for the economy of Queensland. The scores of 0.82, 0.82, and 0.81 respectively represent small improvements from last year.

Respondents who identify as a Traditional Owner of the area had significantly lower rating scores for the importance of the harbour as a local asset.

3.5.6 Values associated with the harbour

The 'Values associated with the harbour' indicator received a score of score of 0.65. It remains little changed from last year and the 2014 baseline. There are seven measures for this indicator with details and scores outlined in Table 8. There is little change in the scores of all measures since 2017 (one or two points at most) apart from a five point decline in 'Spiritually special places' and a three point decline in 'Culturally special places'.

Respondents who identify as a Traditional Owner of the area had significantly higher rating scores for the importance of spiritually, culturally and historically special places.

3.6 Economic component results

The overall grade for the Economic component is a B (score of 0.72) which is a slight decline from 0.74 in 2017 and 0.75 in 2014. There are nine indicators and 11 measures applied to determine the scores and grades for the three indicator groups in the Economic component with details and scores summarised in Table 9.

In the Economic component, no external information was collected to inform the weightings for the economic indicators/measures and economic impact weightings were applied. Aggregation weighting for the indicators groups were derived from the Management experts, Technical experts and Community surveys.

In the last year there has been no change in the score for 'Economic performance' or the associated indicators and little change in 'Economic value (recreation)' which now includes a fourth indicator for water-based recreational activity. The score for the 'Economic stimulus' indicator group continues to decline with a further increase in the unemployment rate and ongoing decline in socio-economic status.

Table 9: Summary of grades and scores for the Economic component

Economic component: 2018 = 0.72 (B) 2017 = 0.74; 2014: 0.75								
Indicator group Score/grade	Indicators	Score			Measures	Score		
		2018	2017	2014		2018	2017	2014
Economic performance 0.90 (A) 2017: 0.90 2014: 0.83	Shipping activity	0.90	0.90	0.83	Shipping activity: productivity	0.90	0.90	0.83
	Tourism	0.90	0.90	0.60	Tourism expenditure including cruise ships	0.90	0.90	0.60
	Commercial fishing	0.35	0.35	0.66	Net fisheries: productivity	0.25	0.30	na
					Trawl fisheries: productivity	0.29	0.25	na
					Pot fisheries: productivity	0.64	0.62	na
Economic stimulus 0.58 (C) 2017: 0.67 2014: 0.87	Employment	0.44	0.53	0.72	Unemployment statistics for the Gladstone LGA	0.44	0.53	0.72
	Socio-economic status	0.64	0.70	0.90	Index of economic resources	0.64	0.70	0.90
Economic value 0.74 (B) 2017: 0.73 2014: 0.75	Land-based recreation	0.76	0.76	0.76	Satisfaction rating from CATI survey + value from 2014 survey	0.76	0.76	0.76
	Recreational fishing	0.68	0.65	0.67	Satisfaction rating from CATI survey + value from 2015 survey	0.68	0.65	0.67
	Beach recreation	0.75	0.74	0.71	Satisfaction rating from CATI survey + value from 2014 survey	0.75	0.74	0.71
	Water-based recreation	0.75	na	na	Satisfaction rating from CATI survey + value from 2017 survey	0.75	na	na

3.6.1 Economic performance

Economic performance retains an A-grade with a score of 0.90 which has not changed from last year but has increased from 0.83 in 2014.

The three indicators of 'Economic performance' are 'Shipping', 'Tourism' and 'Commercial fishing' with 'Shipping' the dominant performer. In 2016-17, the Gladstone Ports Corporation generated **\$471 million** in total income, a slight decrease from \$479 million in 2015-16 but up from \$453 million in 2014-15. Tourism expenditure was worth **\$341 million** (2016-17), up from \$317 million in 2015-16. The 2017-18 GVP for commercial fisheries was worth **\$1.64 million** down from \$1.93 million in 2016-17.

The relative contributions to revenue share across the three activities were applied as impact weightings and consequently the score for the indicator group is dominated by the indicator score for 'Shipping' and the score for 'Commercial fishing' has little influence.

Shipping activity

The indicator 'Shipping activity' has a score of 0.90, which has not changed in the last year but represents a strong improvement from 0.83 in 2014.

The measure for this indicator is calculated from data on monthly shipping movements by cargo type. Cargo is categorised into four types: coal exports, other exports (including LNG), bauxite imports and other imports. In 2017-18, there has only been limited change in shipping activity (Figure 9) with

coal exports declining from a monthly mean of 57 in 2016-17 to 55 in 2017-18 and LNG increasing from 25 in 2016-17 to 26 in 2017-18. Overall, other exports (including LNG) remained unchanged over the same period with a monthly mean of 54.

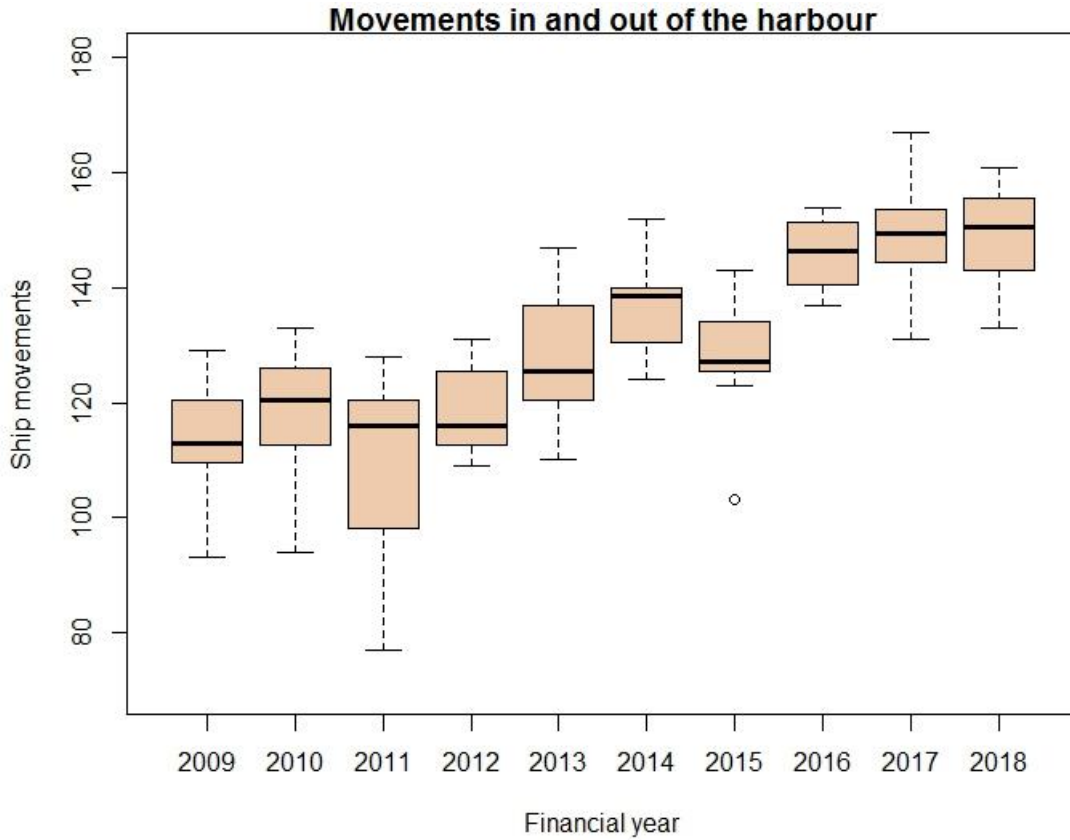


Figure 9: Gladstone Harbour shipping activity, 2009-2018

Shipping activity continues to be dominated by coal exports but in the last three years there has been more variation in activity compared with LNG exports which have been more stable (Figure 10).

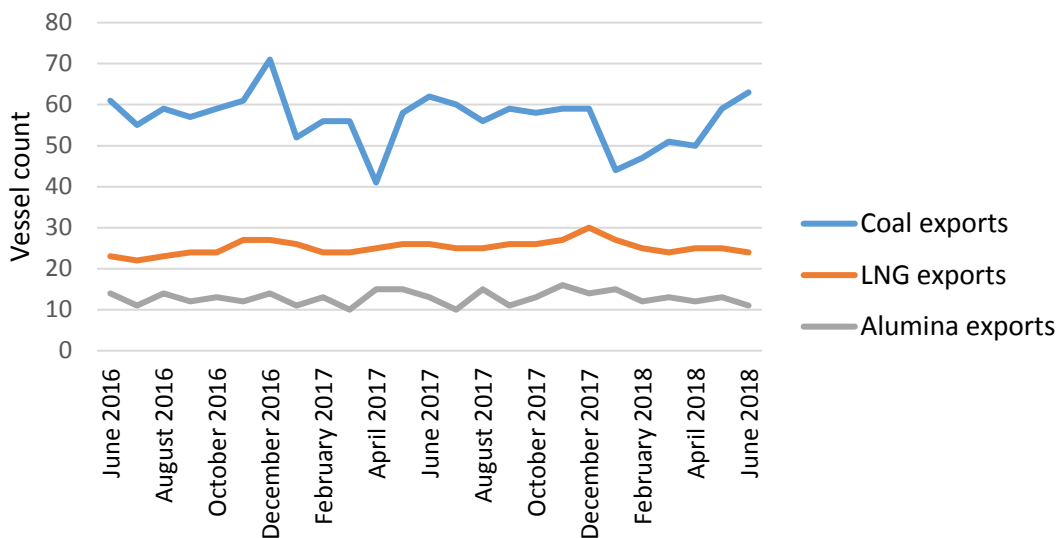


Figure 10: Trends in the three main commodity exports 2016-18

Overall capacity utilisation remains high even when the Fisherman’s Landing expansion is taken into consideration (which has now been completed) (Figure 11) and hence the high score of 0.90 for the indicator.

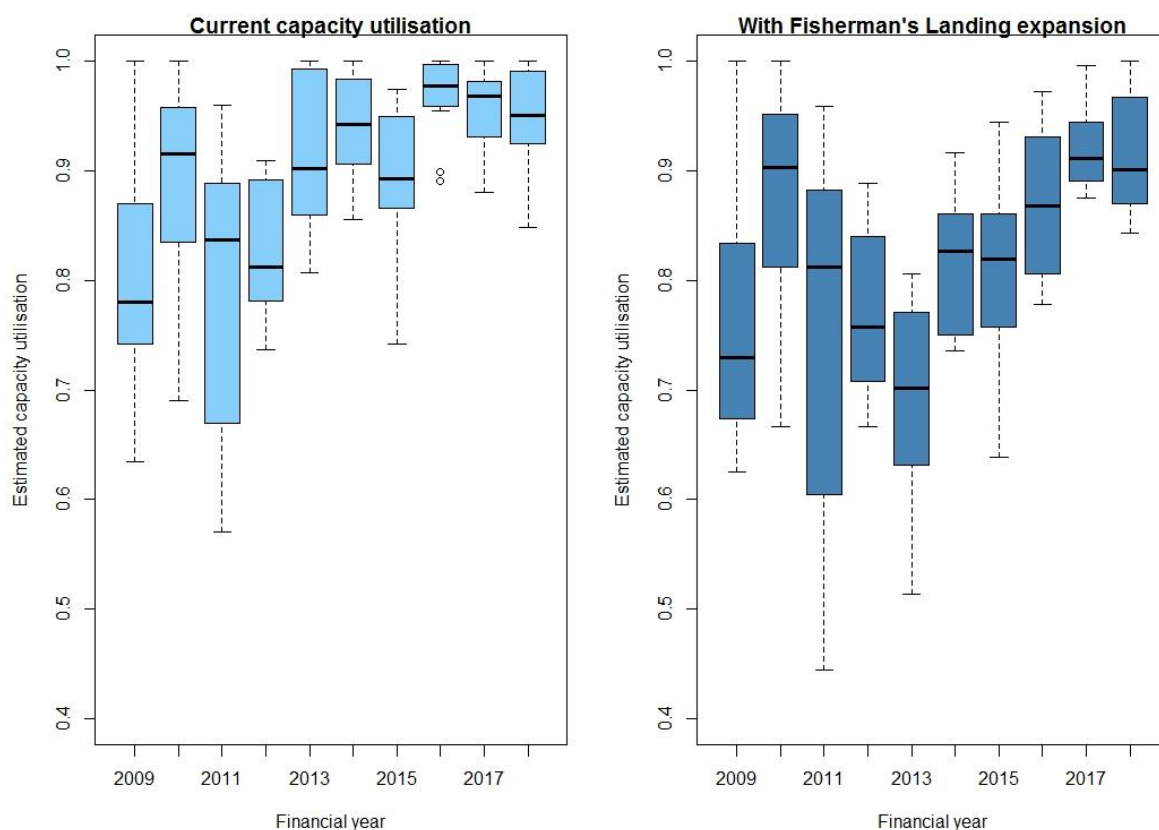


Figure 11: Capacity utilisation with a) current facilities and b) with Fisherman’s Landing expansion

Tourism

‘Tourism’ retains its strong A-grade performance with the score of 0.90 remaining unchanged from last year but representing a substantial increase from 0.60 in 2014. The tourism score is based on expenditure relative to the 10 year average. The total expenditure on tourism (expenditure on accommodation, food and other local services) in the Gladstone region was \$341 million in 2016-17 increasing from \$317 million in 2015-16. In 2016-17, six cruise ships docked at Gladstone Port (Gladstone Ports Corporation Annual Report 2017: 39), a 50% increase from the previous year. The estimated value of \$0.32 million for 2015-16 (AEC 2016) has been increased by 50% to \$0.48 million. This amount has been added to the estimated \$340.19 million in Tourist expenditure for 2016-17 (Gladstone Regional Council website in March 2018), but only represents 0.1% of total expenditure (\$340.67).

Commercial fishing

The ‘Commercial fishing’ indicator has a low score of 0.35 which remains the same as last year but represents a decline from 0.66 in 2014. This score relies upon the calculation of the Gross Value of Production (GVP) for Gladstone Harbour fisheries for 2017-18 which is based on 2017-18 catch and effort data and the latest price information from 2016. The baseline is a 10 year moving average.

This year, the GVP for Gladstone Harbour fisheries was of \$1.64 million, a decline from last year (\$1.93 million) and 2013-14 (\$4.68 million). Although the 2017-18 dataset was incomplete at the

time of reporting (Section 2.4), the comparison with last year is realistic as the data was accessed at the same time last year and was similarly incomplete.

Historically, there has been considerable variation in the GVP for Gladstone fisheries, but there is an apparent decline in recent years from \$4.68 million in 2013-14 (Figure 12b). Despite the decline in productivity, the Gladstone region remains relatively strong when compared with neighbouring regions (Figure 12a). In 2017-18 the 10 year mean GVP from Gladstone was \$3.37 million compared with \$1.31 million for Rockhampton/Yeppoon and \$1.89 million for the Mackay region.

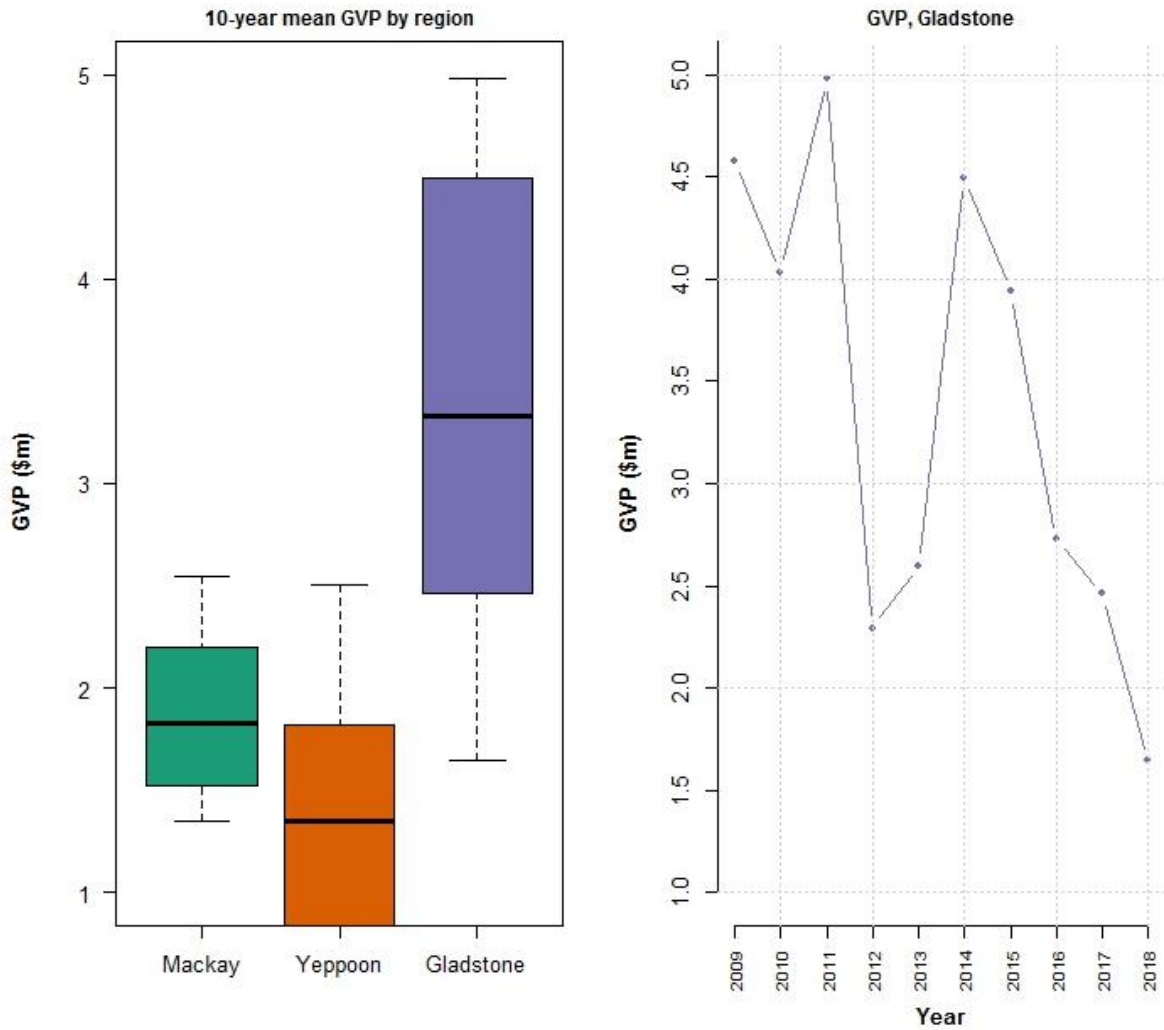


Figure 12: GVP variation for a) the three regional fisheries and for b) Gladstone over time

Prices have remained relatively steady over the five years of reporting with the 2016 price information applied to estimate the GVP for this year (Figure 13).

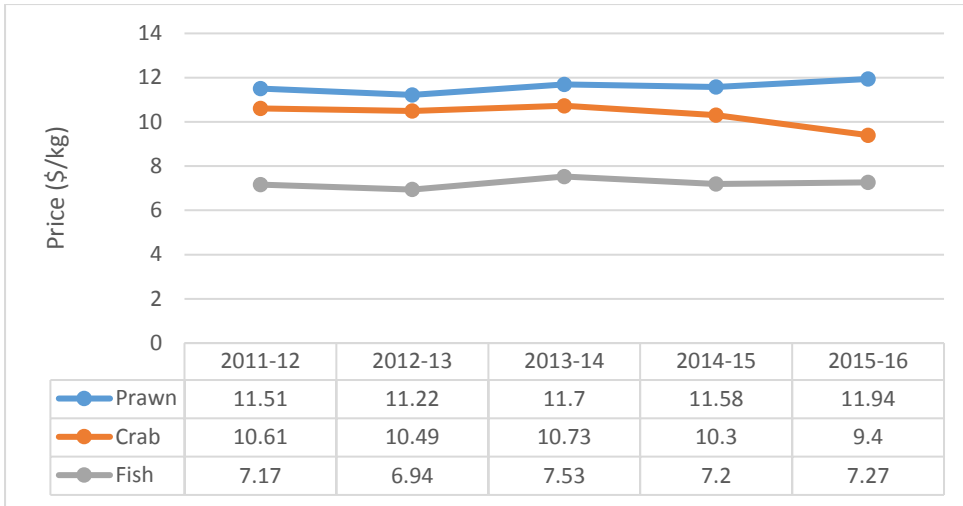


Figure 13: Price changes over time for fish, prawns and crabs

The indicator is comprised of scores originating from three measures: Net fisheries (0.25), Trawl fisheries (0.29) and Pot fisheries (0.64) (Table 9). These measures are weighted by their relative contribution to GVP which is dominated by trawl fisheries (47% of production [catch]; 44 % in 2016-17), Net fisheries (32% of production; 35% in 2016-17) and Pot fisheries (21% of production; 20% in 2016-17) (Figure 14).

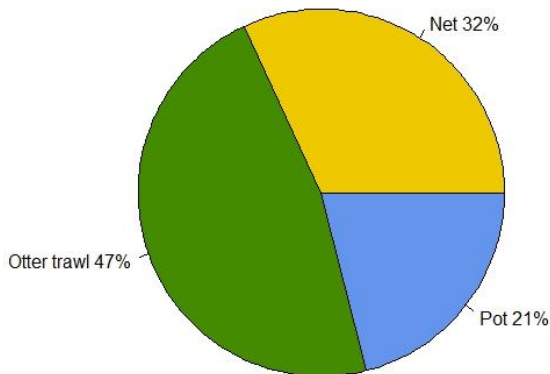


Figure 14: Contribution to total production by fishery sector

3.6.2 Economic stimulus

The ‘Economic stimulus’ indicator group has a C-grade with a score of 0.58. This represents a nine point decrease from 0.67 in 2017 and a 29 point decline from its height of 0.87 in 2014. There are two indicators in this group: ‘Employment’ and ‘Socio-economic status’, with sharp declines evident in their scores.

Employment

The ‘Employment’ indicator receives a score of 0.44 representing a substantial decline from 2017 (0.53) and more notably from 2014 (0.72). The ‘Employment’ score is based on unemployment in the Gladstone LGA compared with the benchmark of unemployment rates in all Queensland LGAs.

In 2018, the unemployment rate for the March quarter was 8.0% compared to a rate of 7.0 for the same period in 2017. In the last 12 months the relative position of Gladstone deteriorated slightly

compared to other LGAs in Queensland from being within 47% to 56% of the cumulative unemployment proportion for the State⁶ (Figure 15). Gladstone now has a much higher unemployment rate than the State unemployment rate (trend) of 6.0% for March 2018⁷ which has improved slightly from 6.4% for March 2017. However, the unemployment rate in Gladstone is lower than the neighbouring regional population centres (LGAs) of Bundaberg (9.2%) and Rockhampton (8.1%).

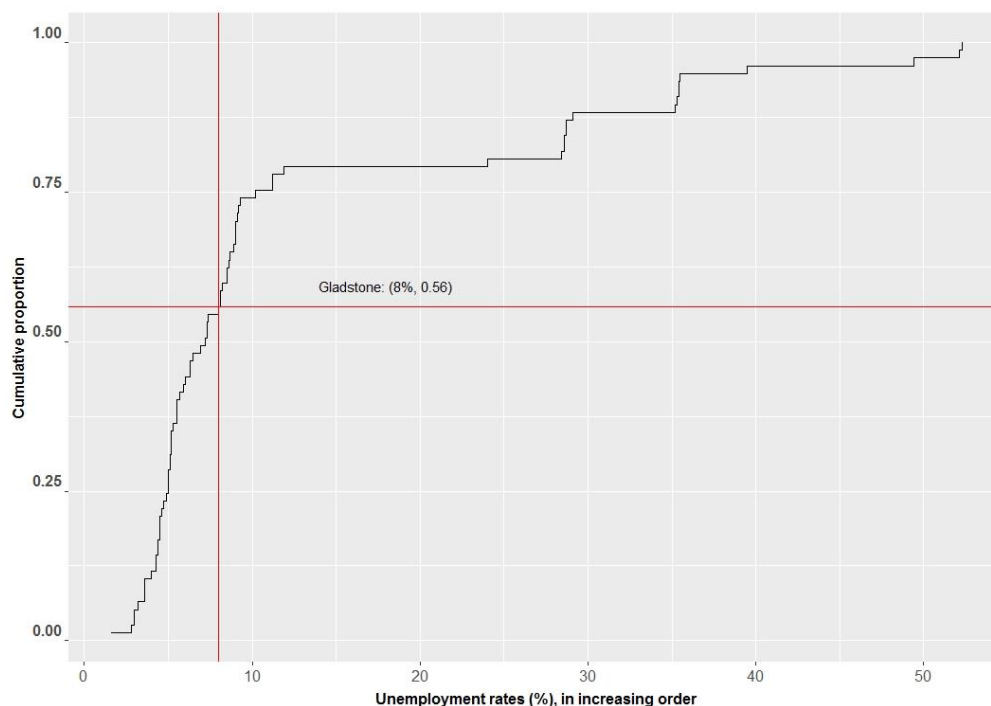


Figure 15: Distribution of unemployment rates for Queensland, March 2017

Socio-economic status

The 'Socio-economic status' indicator continues to decline with a score of 0.64 compared with 0.70 in 2017 and 0.90 in 2014. While the decline this year principally reflects the impact of higher unemployment, the index this year incorporates updated details from the ABS 2016 census data which limits any direct comparison with scores from previous years.

'Socio-economic status' is measured through the Index of Economic Resources (IER) a composite measure of the economic wellbeing of a community. The IER is formally calculated from the ABS Census data with established loadings/ weights for the composite variables. An annually revised estimate for the Gladstone region is derived from information collected in the CATI survey. In 2018 the ABS released the updated loadings and descriptions for the composite variables based on the 2016 Census data (Table 5) which are now applied to estimate the revised estimate for Gladstone.

The IER score for Gladstone estimated by the ABS for the 2011 and 2016 census data highlight the five year decline in socio-economic status. The ABS estimated the IER score for Gladstone from the 2011 census data as 1040 which placed it in the 9th decile in the distribution of LGAs in Australia. In 2016, the IER was estimated at 994, placing it in the 7th decile (ABS Catalogue No. 2033.0.55.001).

⁶ In the March 2018 The Aurukun LGA was not included in the March 2018 due to a lack of accuracy in the data. It has a very high unemployment rate (66.6% recorded for March 2017) which acts to increase the overall rate for Queensland and improves the relative position of Gladstone.

⁷ ABS 6202.0, Labour force, March 2017. released 13 April 2017.

In 2018, the revised index for Gladstone was estimated at 999.49 (compared to 1005.82 for last year) which places it in the 70th percentile in the 2016 distribution of LGAs in Australia (Figure 16).

This translates into a score of 0.64 for the ‘Socio-economic status’ indicator representing a continued annual decline.

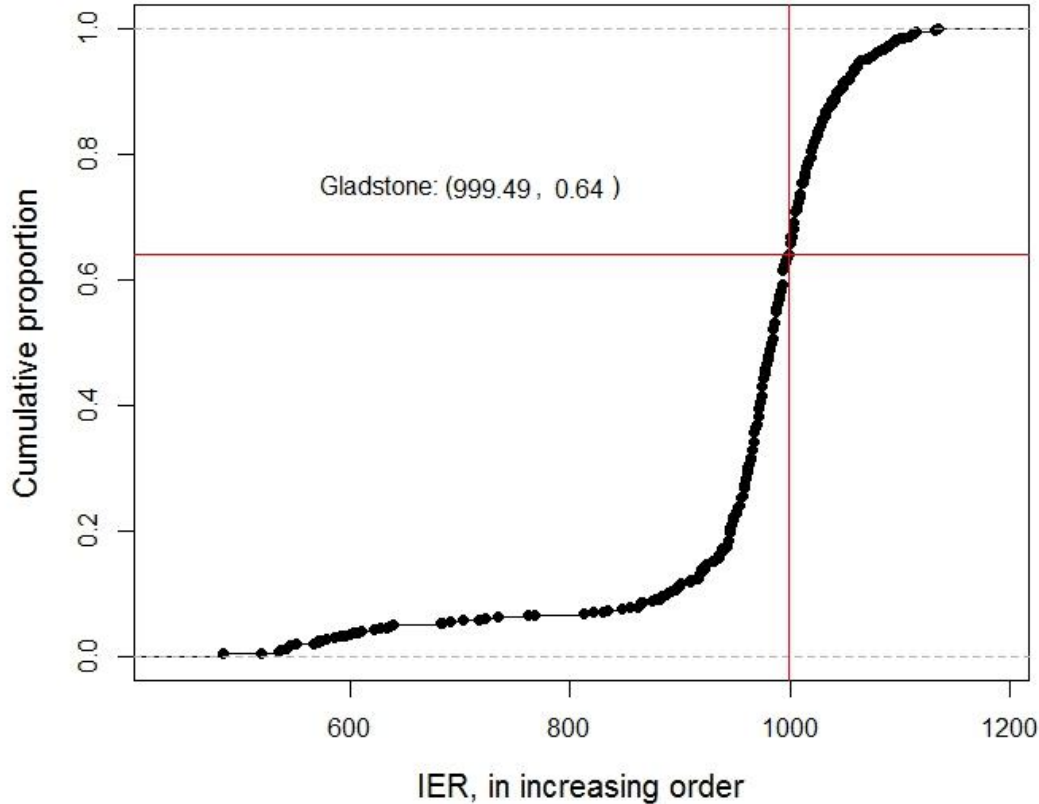


Figure 16: Distribution of IER scores Australia 2016, and 2017 estimate for Gladstone

Statistical tests (Independent Samples T-tests at the 5% significance level) were conducted to identify where there had been significant changes in the scores of the composite variables in the past 12 months. The only significant changes were in the components which had been updated (rent, mortgage repayments and household income) and cannot be compared with the previous year.

3.6.3 Economic value (recreation)

The ‘Economic value’ indicator group was assessed as being B-grade with a score of 0.74 which represents a one point increase from 2017 and a one point decline from 0.75 in 2014. There are four indicators in this group representing the main types of recreational activity: land-based recreation, recreational fishing (land and water), beach recreation and water-based recreation. The scores are determined by the satisfaction rating (for the last recreational trip for each type of activity) and these are then weighted according to the relative economic value.

The score for ‘Land-based recreation’ (0.76) remains unchanged from last year as the decline in satisfaction rating is offset by an increase in participation frequency. The score of 0.68 for ‘Recreational fishing’ has shown a three point increase from last year with improvements in both satisfaction ratings as well as participation frequency. ‘Beach recreation’ remains stable with a score of 0.75 (0.74 in 2017) and ‘Water-based recreation’ is assessed for the first time with a score of 0.75.

This is the same score as beach recreation although water-based recreation has a slightly lower satisfaction rating and lower participation frequency, it has a higher economic trip value.

Details about the economic value of recreational activities have been outlined in Section 3.3. The overall value was estimated at \$138 million.

3.6.3 Economic component summary

The overall grade for the Economic component is a B (score of 0.72) which is a slight decline from 0.74 in 2017 and 0.75 in 2014. The lower score is a result of increasing unemployment and declining socio-economic status ('Economic stimulus') associated with the end of the construction boom in Gladstone and a decline in the resources sector.

There has been no change in the score for 'Economic performance' and little change for 'Economic value (recreation)'.

'Economic performance' continues to be dominated by 'Shipping' (\$471 million) and 'Tourism' (\$341 million). The economic value of recreation increases in importance with the inclusion of a fourth indicator for water-based recreation. The estimated value of recreation (\$138 million) is 40% of the estimated value for tourism. The estimated value of recreational fishing (\$31.19 million) is considerably higher than commercial fishing (\$1.64 million).

The issue of incomplete data for the "Commercial fishing" indicator remain a problem (Section 2.4) and a 2017 recommendation to change the reporting period from the financial year to the calendar year is restated (Recommendation 3).

4. Summary of results and trend analysis

A summary overview of the mean scores and standard deviations, as well as the distribution of the A-E grades is presented below for the three components. Each section also includes a trend analysis provided in a summary table of scores for all four reporting periods.

In each figure below there are two graphs. The one on the left provides information about the mean report card scores and their standard deviations. The figure on the right provides information about how the mean score was derived from the different proportions in each of the A-E grades. For example, in the first figure below for the Social component (Figure 17) the mean score for 'Harbour access' is 0.67 which is comprised a 3.6% probability of being in Grade A, 77.2% in Grade B, 19.1% in Grade C and 0.1% in Grade D.

Overall, across the three components there has been relatively little change in the health of the harbour in the last 12 months, but notable improvements since the 2014 baseline year of reporting are maintained. Recent changes in the past year have occurred mainly in the Economic component, with continuing declines in the indicators 'Employment' and 'Socio-economic status' in the 'Economic stimulus' group. Notable changes are also evident in 'Marine safety incidents' and 'Oil spills' ('Harbour safety') in the Social component.

4.1 Social component

The overall grade for the Social component is a B (score of 0.67) which represents little change from last year (0.66) but a strong improvement since 2014 (0.58).

In the last year there has been little change in the scores for the ‘Harbour access’ and ‘Harbour usability’ indicator group or associated indicators. The ‘Liveability and wellbeing’ indicator group/indicator has improved its score partly as a result of the inclusion of a new measure ‘Aesthetic value’ and partly from an increase (three point) in the score for the measure ‘Makes living in Gladstone a better experience’.

There has been a considerable change in the scores for ‘Marine safety incidents’ and ‘Oil spills’.

A summary overview of the mean scores and standard deviations, as well as the distribution of the A-E grades is presented for the Social component in Figures 17-20.

4.1.1 Social component summary figures

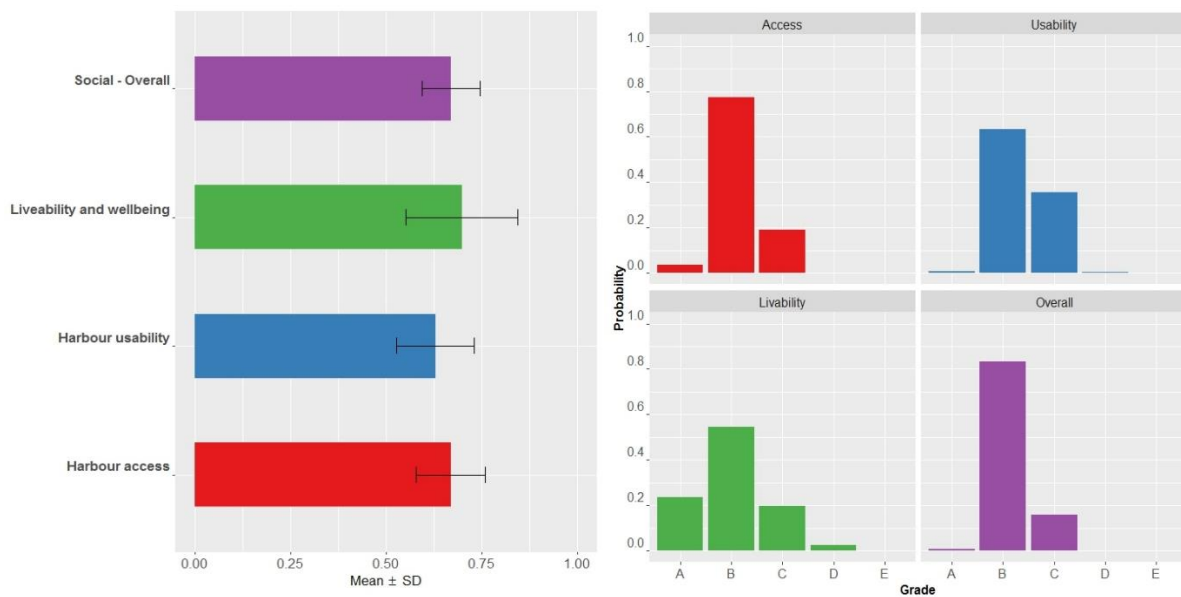


Figure 17: **Social component.** Mean scores, standard deviations and A-E grade distribution for the component and indicator groups

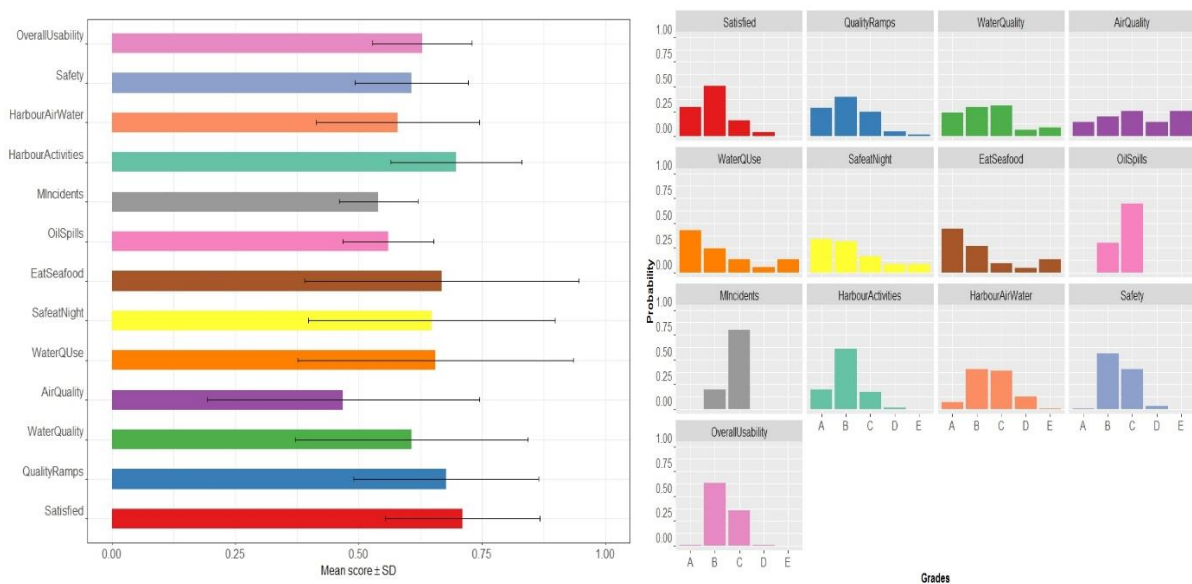


Figure 18: **Harbour usability.** Mean scores, standard deviations and A-E grade distribution for the figure, indicators and measures

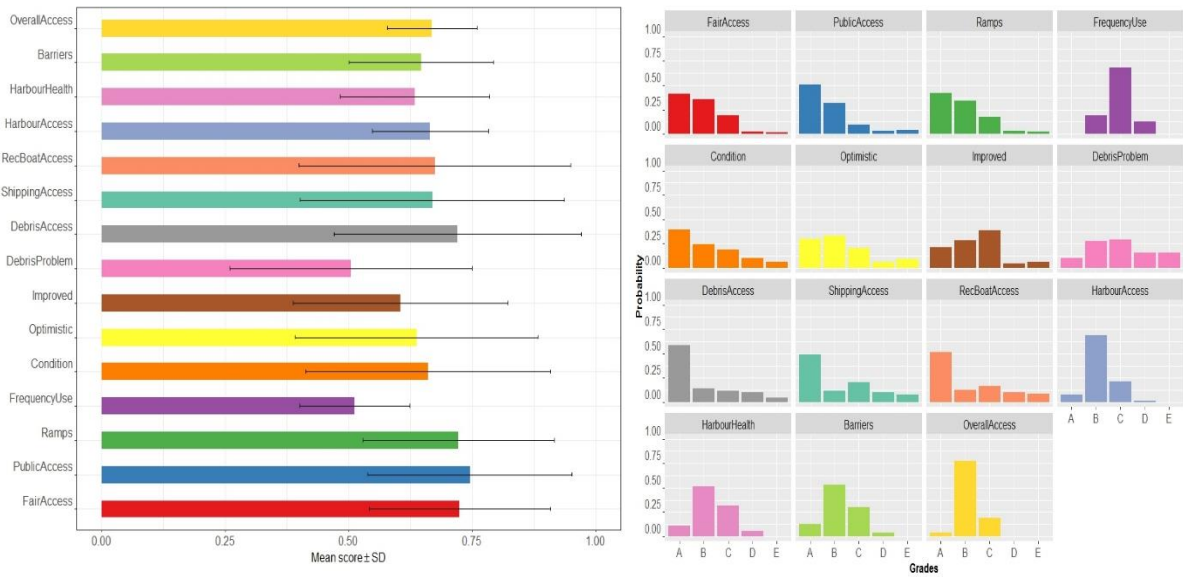


Figure 19: **Harbour access.** Mean scores, standard deviations and A-E grade distribution for the group, indicators and measures

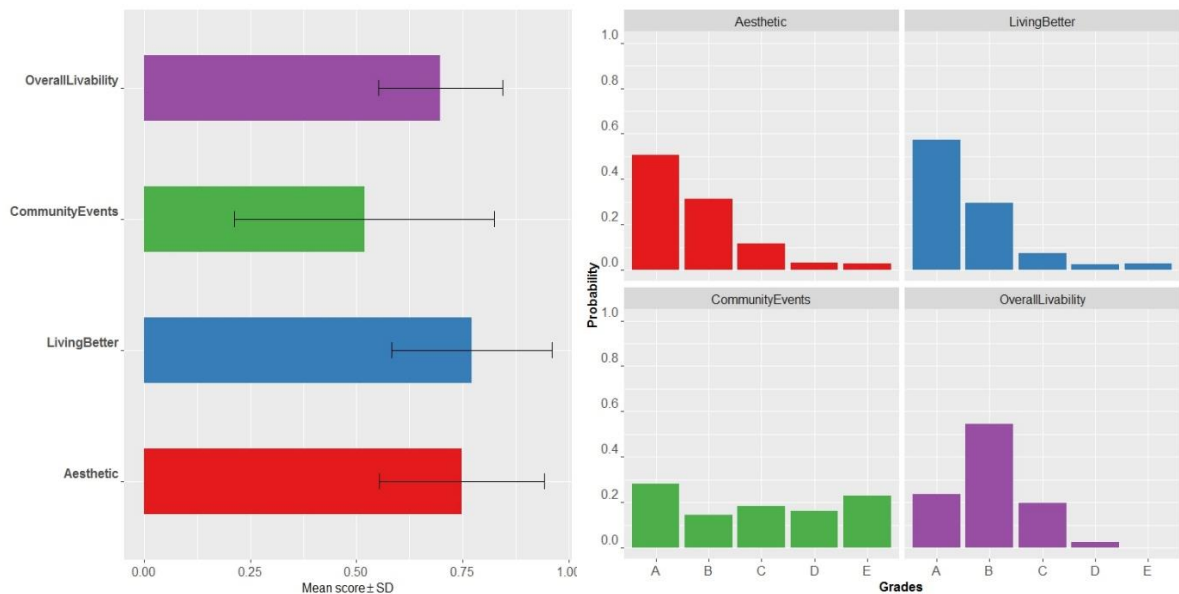


Figure 20: **Liveability and wellbeing.** Mean scores, standard deviations and A-E grade distribution for the group/indicators and measures

4.1.2 Social component summary of scores for trend analysis

There has been consistent improvement in the three indicator groups since the 2014 baseline (Figure 21). ‘Harbour access’ seems to have made a sustained improvement while Improvements in ‘Harbour usability’ have fluctuated. The inclusion of a new measure for aesthetic value has improved the performance of ‘Liveability and wellbeing’.

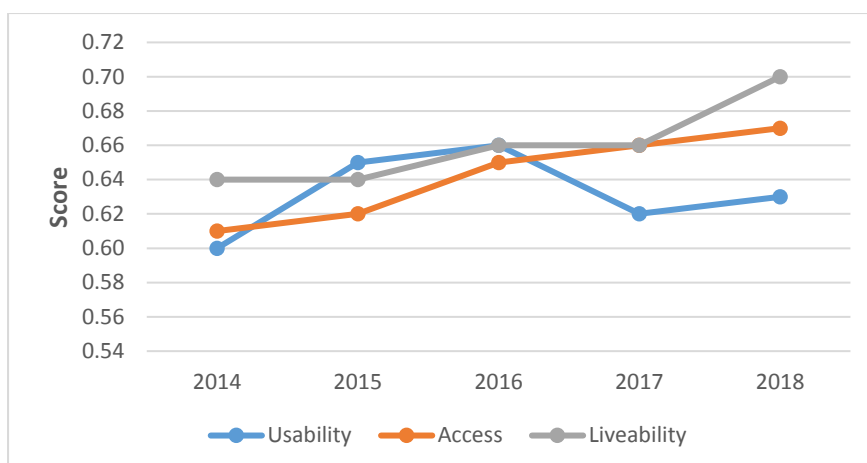


Figure 21: Temporal trends in scores for social indicator groups

Although there has been little change in the scores for most of the indicators in the past year, most have recorded a steady increase in the since 2014 (Table 10).

Some indicator improvements have been relatively steady:

- Air and water quality (Harbour usability) - 12 points
- Harbour health (Harbour access) - 10 points
- Boat ramps and public spaces (Harbour access) – 6 points
- Access to the harbour (Harbour access) – 5 points

Some have fluctuated:

- Harbour safety ((Harbour usability)

While others have shown less variation:

- Recreational activities (Harbour usability)
- Liveability and wellbeing (Liveability and wellbeing) (apart from 2018 assessment change)
- Barriers to access (Harbour access)

There are 23 measures in the social component and since the 2014 baseline

Most (16) have shown a steady increase (principally in the Access indicator group) of 5 points or more, notably:

- Satisfaction with water quality (22 points)
- Happy to eat seafood (12 points)
- Harbour condition great (12 points)
- Harbour condition improved in last year (10 points)

Only 4 have shown any decline since 2014, and only by one or two points.

- Marine debris is a problem (Barrier to access) 1 point
- Recreation boats reduced my use (Barrier to access) 2 points
- Participate in community events (Liveability and wellbeing) 1 point
- satisfied with last recreation trip (due to estimation errors)

Table 10: Annual summary of the Social component scores and grades

Social	Group	Indicators	2018	2017	2016	2015	2014	Measures	2018	2017	2016	2015	2014	14-18*					
2018	Usability	Recreational activities	0.70	0.69	0.67	0.69	0.70	How satisfied last recreational trip	0.71	0.70	0.66	0.70	0.74	-3					
			0.63	0.62	0.66	0.66	0.63	Quality of ramps and facilities	0.68	0.68	0.68	0.66	0.63	+5					
		0.66	0.62	0.66	0.66	0.63	Air & water quality	0.58	0.56	0.55	0.52	0.46	Water quality (WQ) satisfaction	0.61	0.58	0.56	0.51	0.39	+22
		0.66	0.66	0.66	0.66	0.63	Air quality satisfaction	0.47	0.47	0.45	0.43	0.40	+7						
		0.64	0.65	0.65	0.65	0.63	WQ affects harbour use	0.66	0.64	0.65	0.61	0.58	+8						
		0.58	0.60	0.60	0.60	0.58	Safety for human use	0.61	0.60	0.76	0.72	0.38	Marine safety incidents	0.54	0.76	0.90	0.88	0.24	-30
		0.67	0.67	0.67	0.67	0.67	Oil spills	0.56	0.38	0.88	0.82	0.15	+41						
		0.67	0.67	0.67	0.67	0.67	Safety at night	0.65	0.64	0.63	0.60	0.58	+7						
		0.67	0.67	0.67	0.67	0.67	Happy to eat seafood	0.67	0.64	0.60	0.57	0.55	+12						
		0.67	0.67	0.67	0.67	0.67	Access	0.72	0.72	0.69	0.68	0.67	Fair access to harbour	0.72	0.72	0.69	0.68	0.67	+5
	0.67	0.67	0.67	0.67	0.67	Boat ramps+ public spaces	0.66	0.65	0.64	0.62	0.60	Frequency of use	0.51	0.51	0.51	0.49	0.46	+6	
	0.66	0.66	0.66	0.66	0.66	Number of boat ramps	0.72	0.69	0.67	0.65	0.65	+7							
	0.65	0.65	0.65	0.65	0.65	Access to public spaces	0.75	0.72	0.72	0.70	0.68	+7							
	0.62	0.62	0.62	0.62	0.62	Harbour health	0.63	0.63	0.62	0.58	0.53	Great condition	0.66	0.66	0.65	0.60	0.54	+12	
	0.61	0.61	0.61	0.61	0.61	Optimistic about future health	0.64	0.61	0.61	0.57	0.56	+8							
	0.61	0.61	0.61	0.61	0.61	Improved last 12 months	0.60	0.60	0.61	0.56	0.50	+10							
	0.61	0.61	0.61	0.61	0.61	Barriers to access	0.65	0.65	0.65	0.61	0.64	Marine debris a problem	0.50	0.50	0.51	0.50	0.51	-1	
	0.61	0.61	0.61	0.61	0.61	Marine debris affects access	0.72	0.72	0.71	0.67	0.70	+2							
	0.61	0.61	0.61	0.61	0.61	Shipping reduced my use	0.67	0.70	0.69	0.60	0.63	+4							
	0.61	0.61	0.61	0.61	0.61	Recreation boats reduced my use	0.67	0.67	0.66	0.64	0.69	-2							
	0.61	0.61	0.61	0.61	0.61	Liveability wellbeing	0.70	0.66	0.66	0.64	0.64	Makes living in Gladstone better	0.77	0.74	0.73	0.70	0.71	+6	
	0.61	0.61	0.61	0.61	0.61	Participate in community events	0.52	0.54	0.55	0.53	0.53	-1							
	0.61	0.61	0.61	0.61	0.61	Aesthetic value	0.75	na	na	na	na	na							

* Decimal point change in scores between 2014 and 2018

4.2 Cultural component: 'Sense of place' indicator group

A summary overview of the mean scores and standard deviations, as well as the distribution of the A-E grades is presented for the Cultural 'Sense of place' indicator group in Figure 22.

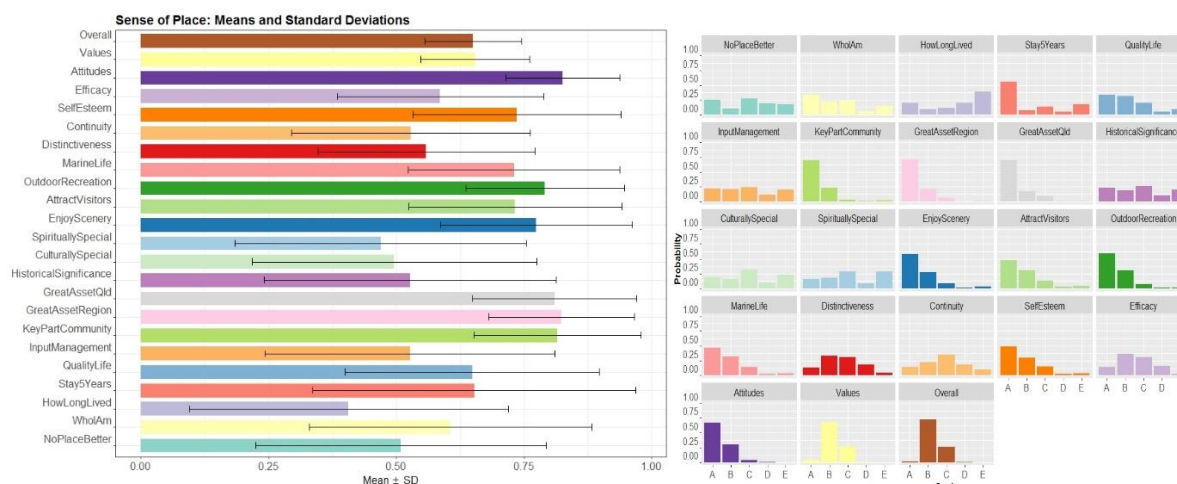


Figure 22: ‘Sense of place’. Mean scores, standard deviations and A-E grade distribution for the indicator group, indicators and measures

There has been little change in the score for the indicator group over time with a one point change from the 2014 baseline (Table 11). There are six indicators in this group with relatively small annual changes in indicator scores. The ‘Self-esteem’ and ‘Self-efficacy’ indicators have recorded the largest improvements from the 2014 baseline (five and four points respectively), with the 2018 increase for ‘Self-efficacy’ based on an improved score for the measure ‘Input into management’. The ‘Continuity’ indicator is the only one to record a decrease from the baseline (four points) and relates to a decline in the average length of residency in the area, evident since 2017.

Table 11: Annual summary of the ‘Sense of place’ scores and grades

Group	Indicators	2018	2017	2016	2015	2014	Measures	2018	2017	2016	2015	2014	14-18*	
2018	0.65	Distinctive	0.56	0.57	0.59	0.55	No place better	0.51	0.51	0.56	0.49	0.49	+2	
2017	0.65		Who I am	0.61	0.62	0.62	0.61	0.61	0					
2016	0.66	Continuity	0.53	0.54	0.59	0.57	How long lived in area	0.41	0.43	0.47	0.46	0.46	-5	
2015	0.65		Plan to stay 5 years	0.65	0.64	0.71	0.68	0.68	-3					
2014	0.64	Self esteem	0.74	0.72	0.74	0.72	Proud living in Gladstone	0.74	0.72	0.74	0.69	0.69	+5	
			Self-efficacy	0.59	0.58	0.58	0.56	0.55	Quality of life	0.65	0.67	0.67	0.64	0.64
		Attitudes		0.83	0.81	0.81	0.80	0.80	Input into management	0.53	0.50	0.49	0.46	0.46
			Values	0.65	0.66	0.66	0.64	0.64	Key part of community	0.82	0.81	0.79	0.79	0.79
		Variety of marine life		0.73	0.71	0.71	0.64	0.64	Great asset to region	0.82	0.80	0.80	0.79	0.79
			Recreation opportunity	0.79	0.77	0.77	0.76	0.76	Great asset to Queensland	0.81	0.79	0.80	0.81	0.81
		Attracts visitors		0.73	0.71	0.72	0.67	0.67	Variety of marine life	0.73	0.71	0.71	0.64	0.64
			Enjoy scenery and sights	0.77	0.76	0.75	0.75	0.75	Recreation opportunity	0.79	0.77	0.77	0.76	0.76
		Spiritually special places		0.47	0.52	0.53	0.52	0.52	Attracts visitors	0.73	0.71	0.72	0.67	0.67
			Culturally special places	0.50	0.53	0.53	0.50	0.50	Enjoy scenery and sights	0.77	0.76	0.75	0.75	0.75
		Historical significance		0.53	0.54	0.56	0.58	0.58	Spiritually special places	0.47	0.52	0.53	0.52	0.52
								Culturally special places	0.50	0.53	0.53	0.50	0.50	0
							Historical significance	0.53	0.54	0.56	0.58	0.58	-5	

* Decimal point change in scores between 2014 and 2018

There are 17 measures in this indicator group and since the 2014 baseline

- 4 are associated with an increase of 5 points (decimal point change in score since 2014) or more. Notably
 - Variety of marine life (9 points)
 - Input into management (7 points)
- 5 are associated with a modest increase of 2-3 points
- 4 are associated with little or no change 0-1 points
- 4 are associated with a decrease of 3-5 points

Residents who identify as a Traditional owner of the area continue to have significantly higher survey rating scores for three of the ‘Values’ measures: the importance of spiritually, culturally and historically special places as harbour values.

4.3 Economic component

The overall grade for the Economic component is a B (score of 0.72) which is a slight decline from 0.74 in 2017 and 0.75 in 2014. The lower score is a result of increasing unemployment and declining socio-economic status (‘Economic stimulus’) associated with the end of the construction boom in Gladstone and a decline in the resources sector. There has been no change in the score for ‘Economic performance’ and little change for ‘Economic value (recreation)’.

A summary overview of the mean scores and standard deviations, as well as the distribution of the A-E grades is presented for the Economic component in Figures 23-26.

4.3.1 Economic component summary figures

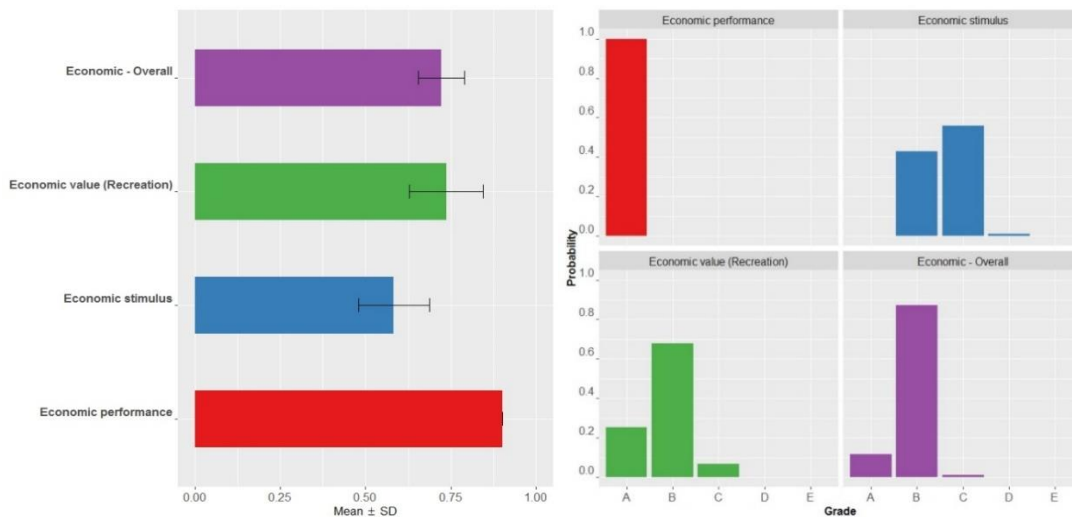


Figure 23: **Economic component.** Mean scores, standard deviations and A-E grade distribution for the component and indicator groups

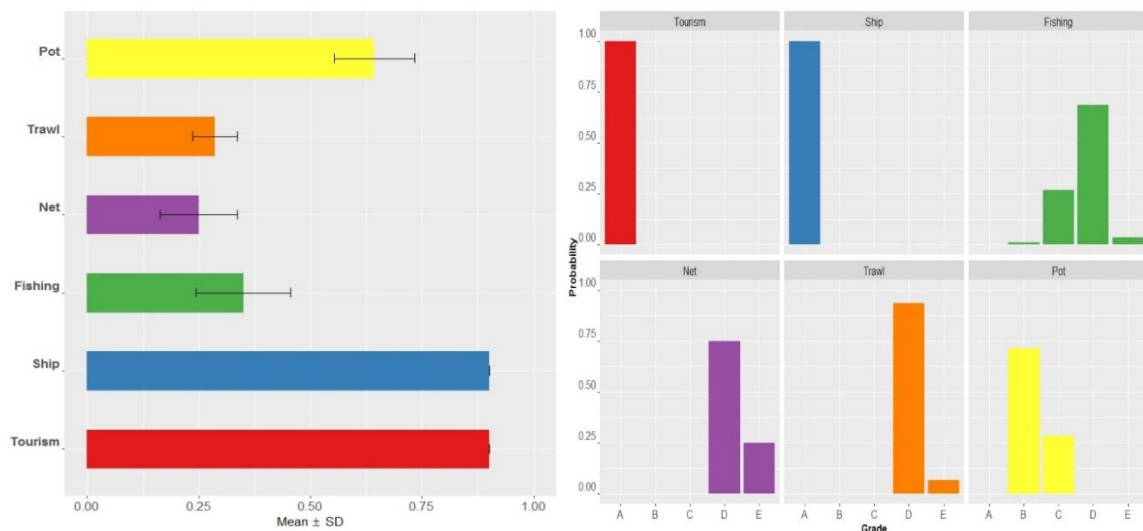


Figure 24: **Economic performance.** Mean scores, standard deviations and A-E grade distribution for the indicator group, indicator/measures and measures

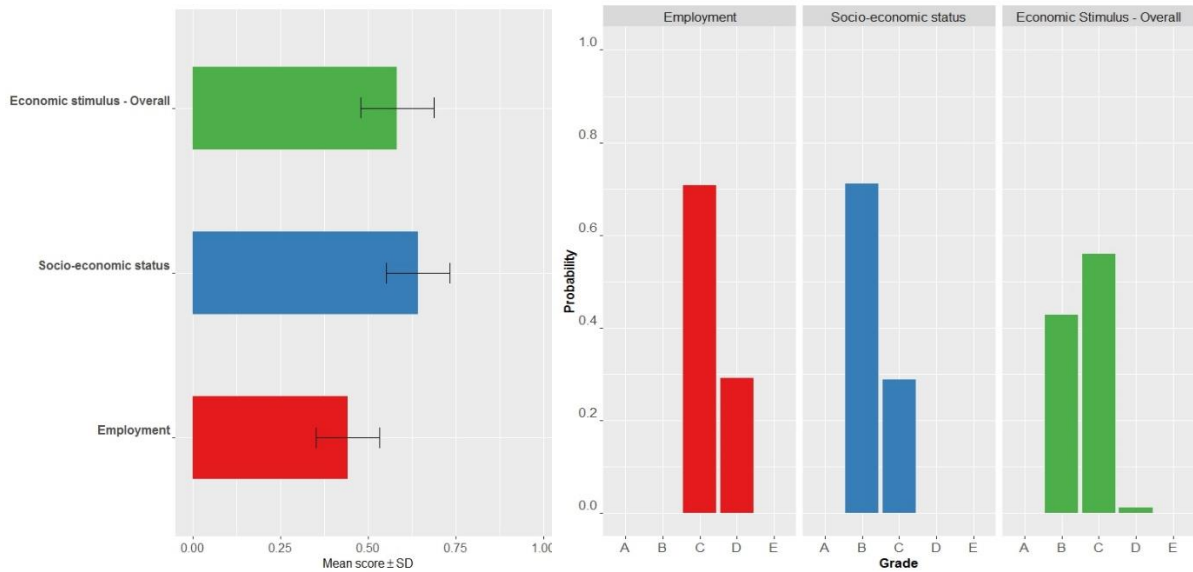


Figure 25: **Economic stimulus.** Mean scores, standard deviations and A-E grade distribution for the indicator group and indicator/measures

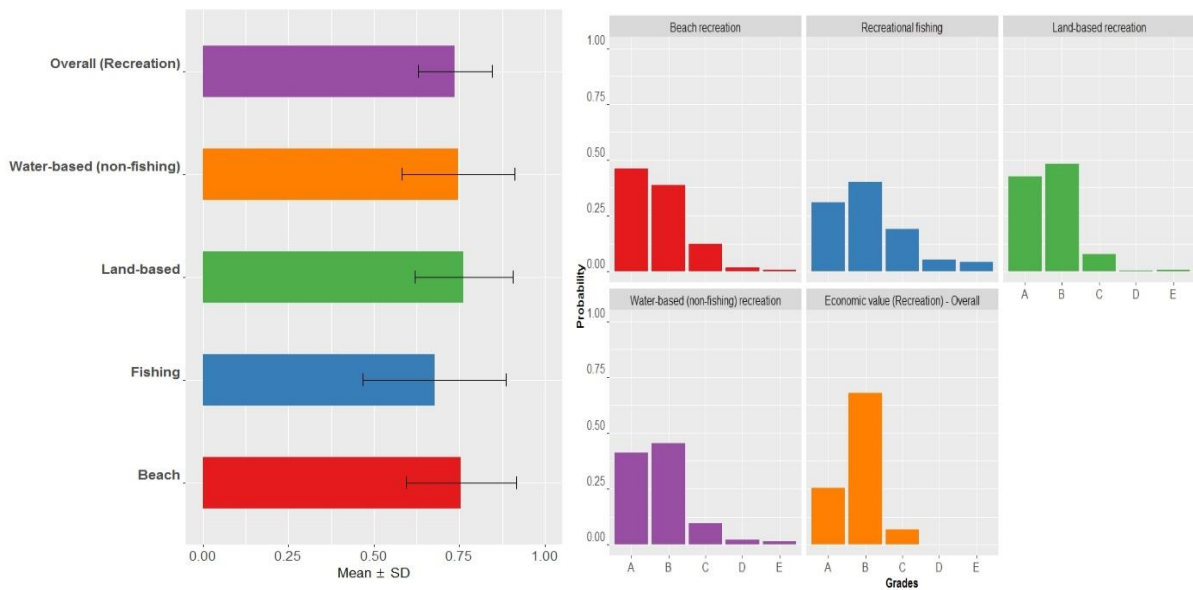


Figure 26: **Economic value (recreation).** A-E grade distribution for the overall indicator group and the indicators/measures

4.3.2 Economic component summary of scores for trend analysis

The score for the Economic component has only changed by three points from the 2014 baseline, but the trends for the three indicator groups are quite different (Table 12). ‘Economic performance’ has stabilised (approaching the full extent of its capacity) after continued improvement, ‘Economic stimulus’ is steadily declining, and ‘Economic value (recreation)’ remains stable.

Since the 2014 baseline, the ‘Tourism’ indicator has recorded the strongest improvement (30 points) although there have been influential changes in secondary source data. The change in source data, first implemented 2015 (Cannard et al. 2015) has increasing influence on the 10 year moving average. The inclusion of expenditure from cruise ships, first included in 2017, has little impact as it only represents 0.1% of total tourism expenditure.

The 'Employment' and 'Socio-economic status' indicators have recorded significant declines of 28 points and 26 points respectively.

Table 12: Annual summary of the Economic component scores and grades

Economic	Group	Indicators	2018	2017	2016	2015	2014	Measures	2018	2017	2016	2015	2014	14-18*
	Performance													
2018	0.72	2018	0.90	0.90	0.87	0.82	0.83	Shipping	0.90	0.90	0.87	0.82	0.83	+7
2017	0.74	2017	0.90	0.90	0.72	0.64	0.60	Expenditure	0.90	0.90	0.72	0.64	0.60	+30
2016	0.75	2016	0.87					Net fisheries	0.25	0.30	0.34	0.30	na	
2015	0.77	2015	0.79					Trawl fisheries	0.29	0.25	0.38	0.83	na	
2014	0.75	2014	0.83					Pot fisheries	0.64	0.62	0.65	na	na	
	Stimulus													
2018	0.58	2018	0.44	0.53	0.62	0.64	0.72	Unemployment	0.44	0.53	0.62	0.64	0.72	-28
2017	0.67	2017	0.64	0.70	0.80	0.95	0.90	Index Econ Res	0.64	0.70	0.80	0.95	0.90	-26
2016	0.74	2016												
2015	0.82	2015												
2014	0.87	2014												
	Value(Rec)													
2018	0.74	2018	0.76	0.76	0.76	0.73	0.76	Land rec	0.76	0.76	0.76	0.73	0.76	0
2017	0.73	2017	0.68	0.65	0.66	0.71	0.67	Fishing rec	0.68	0.65	0.66	0.71	0.67	+1
2016	0.73	2016	0.75	0.74	0.75	0.70	0.71	Beach rec	0.75	0.74	0.75	0.70	0.71	+4
2015	0.72	2015	0.75	na	na	na	na	Water rec	0.75	na	na	na	na	na
2014	0.75	2014												

* Decimal point change in scores between 2014 and 2018

5. Recommendations

5.1 Implications for the 2019 report card for noting

Recommendation 1: 'Tourism expenditure' (Economic performance) change in source data

Information about tourism expenditure for the reporting periods 2013-14 to 2016-17 has been sourced from economic modelling (produced by REMPLAN (Consultants) for Gladstone Regional Council, with the results publically available on the council website. Details for 2016-17 were available and accessed from the council website in March 2018. However, by June 2018 the information was no longer available and a new source of information will be required for the 2019 report card. Information about the economic profile of Gladstone is now provided by another supplier (.id the population experts). Details about the output from tourism (and hospitality) in the 2016-17 economic profile now relate to the previous year (2015-16) with a reported value for tourism and hospitality sales of \$186.1M and a total added value of \$90.5M. Information is sourced from the National Institute of Economic and Industry Research (NIEIR) ©2016. The REMPLAN estimate for the same period was \$316.673M which was applied in the 2017 report card with an additional premium of \$0.32m to account for expenditure from cruise ships.

While it is possible to apply the REMPLAN estimate and maintain consistency for the current year, new provisions will need to be made for the next reporting period. This will be the third change in source material for this indicator in the 10 year time series data.

5.2 Recreational fishing valuation update

Recommendation 2: Update the value for recreational fishing

There is a section in the CATI survey which collects details about a specific recreational activity that can be applied to estimate the economic value of the activity. This information is easy to collect and has been included in four of the five report card surveys. It is recommended that the practice continues.

In 2018, details about fishing recreation were collected in the CATI survey to provide supplementary data and update the 2015 valuation with details outlined in Appendix D.3. It is recommended that the value of a recreational fishing trip currently applied in report card analysis (\$143) be updated to the newly estimated value of \$120.76, although the difference is not great. It should be noted that the change in valuation does not imply an underlying change in value, just that the improved sample size provides a more robust value estimate.

Two key lessons:

1. There is considerable heterogeneity in the recreational fishing data, both within the boat-based activity and across boat and shore-based activity. Updating previous data with supplementary information provides a more robust valuation model and consideration should be given to this option in future rather than estimating a new updated value with data from a single year.
2. Values for boat-based and shore-based fishing vary substantially. Current data should not be supplemented with data relating to only one activity. Similarly, it is not advisable to transfer the value for the combined activity to estimate values for either of the separate activities in a benefit transfer.

5.3 Commercial fishing data

Recommendation 3: Change the current method to calculate the score for commercial fishing

Last year information was provided about the extent of missing values and incomplete data in the commercial fishing dataset. There was a recommendation to move the reporting period from the financial year to the calendar year to try and capture a more accurate summary of the commercial fishing sector. The recommendation was not accepted so as to maintain consistency with the reporting period for the other two indicators ('Shipping' and 'Tourism') in the 'Economic performance' indicator group. The recommendation to change the scoring methodology is reiterated this year with three options provided for consideration.

Currently, the score for commercial fishing is calculated from data available for the financial year. However, at the time of reporting, data for the financial year is incomplete with at least 3 months data being unavailable. To maintain consistency with previous reports, the score is calculated without the missing data and no other data is substituted in its place. This means that the score is an inaccurate reflection of annual production.

To provide a more complete assessment of annual production one option would be to change the reporting period from the financial year to the calendar year as recommended last year. The difference between the two reporting periods is outlined in Table 13. If fishing data from the 2017 calendar year was applied instead of data from the 2017-18 financial year, the production (kgs) output would have increased by 38%, 63% and 26% for the net, trawl and pot fishery sectors respectively, while the effort (days) output would have increased by 23%, 40% and 26% respectively.

Table 13: Fishing production variation between the financial and calendar year reporting periods

Grid	Period	Net (fish) fishery			Trawl (prawns) fishery			Pot (crab) fishery		
		Kgs	Days	Licences	Kgs	Days	Licences	Kgs	Days	Licences
O25	2017-18	43,728	292	14	91,416	441	28	11,912	392	13
R29	2017-18				6072	45	7	14,138	773	14
S30	2017-18	58,852	673	20	43,213	270	14	78,572	2,688	32
	Total	102,580	965	34	140,701	756	49	104,622	3,853	59
O25	2017	55,720	382	13	136,004	631	36	12083	539	12
R29	2017				20,384	100	17	15059	760	15
S30	2017	85,876	808	22	73,277	331	14	104,476	3,541	35
	Total	141,596	1190	35	229,665	1,062	67	131,618	4,840	62
	Variation	38%	23%		63%	40%		26%	26%	

Option 1: Change the reporting period from the financial year to the previous calendar year.

- one advantage of this option is that it would be easy to adjust the 10 year average accordingly and potentially recalculate the scores from previous year to better determine temporal trends
- another advantage is that it would better address the broader problem of missing values in the data which are primarily, but not exclusively, associated with the last three months of the financial year

Two other options to account for the problem of the missing data may also be considered,

Option 2: Replace missing data with data from the corresponding period in the previous year

Option 3: Adjust the benchmark to account for the proportion of time that data is available

5.4 'Marine safety incidents' and 'Oil spills' (Harbour Usability)

Recommendation 4: Remove 'Marine safety incidents' and "Oil spills" as measures for Harbour Usability

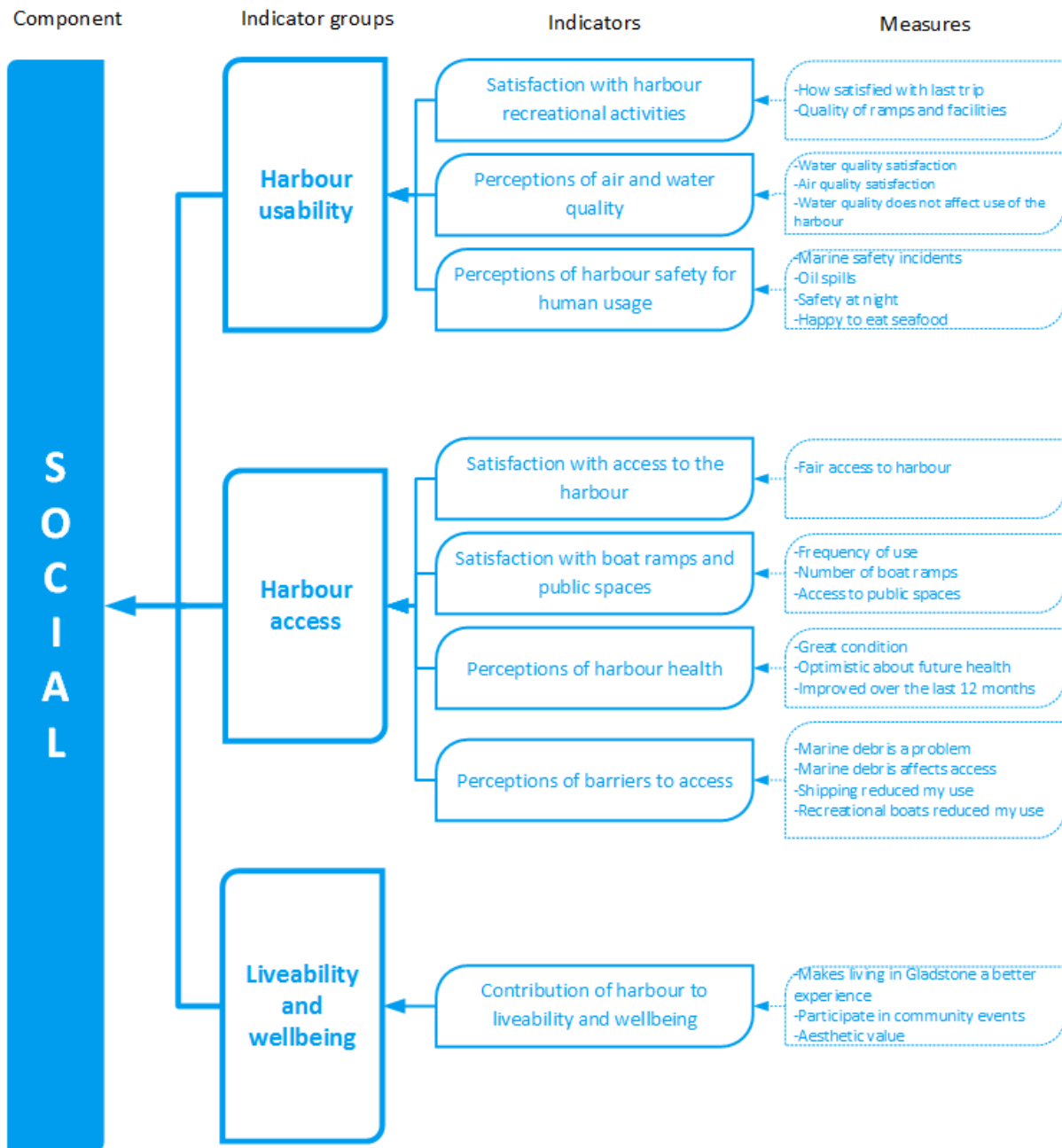
'Marine safety incidents' and 'Oil spills' are two of four measures applied to assess the social indicator 'Perceptions of harbour safety for human use'. Both measures are based on secondary data sources and are not a reflection of community perceptions. Neither measure provides a good indication of activity in Gladstone Harbour as the datasets relate to the Gladstone maritime region which incorporates to a much larger area and includes the Port of Gladstone, Port Alma, Port of Bundaberg and marinas in Hervey Bay, Bundaberg and Rosslyn Bay. Locational details of where incidents occur is recorded in the dataset for oil spills but not for marine safety incidents. For example, in 2017 there were 11 oil spills reported in the Gladstone maritime region, but only five (45%) of these occurred in the Gladstone Harbour area. Currently no editing of the dataset is conducted in line with established methodology.

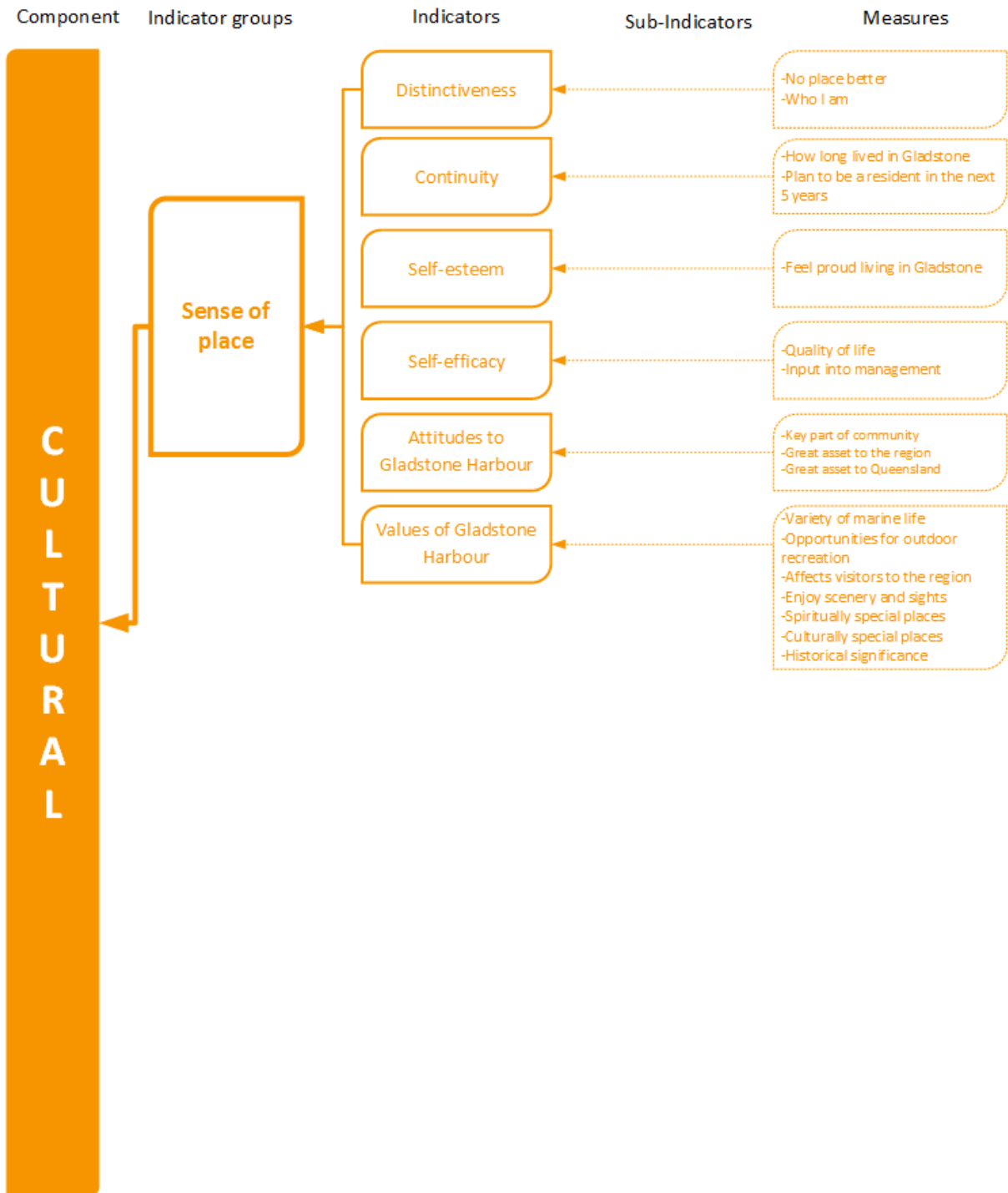
Furthermore, the scores for these two measures are highly variable across reporting periods (unlike the relatively stable scores of the other two measures) with notable changes this year (Table 10). A relatively small change in the raw data (incident rate) for either measure translates into a bigger change in score compared to the measures assessed from primary source (CATI survey) data. As a result, the scores can have an undue influence on the overall score for the indicator.

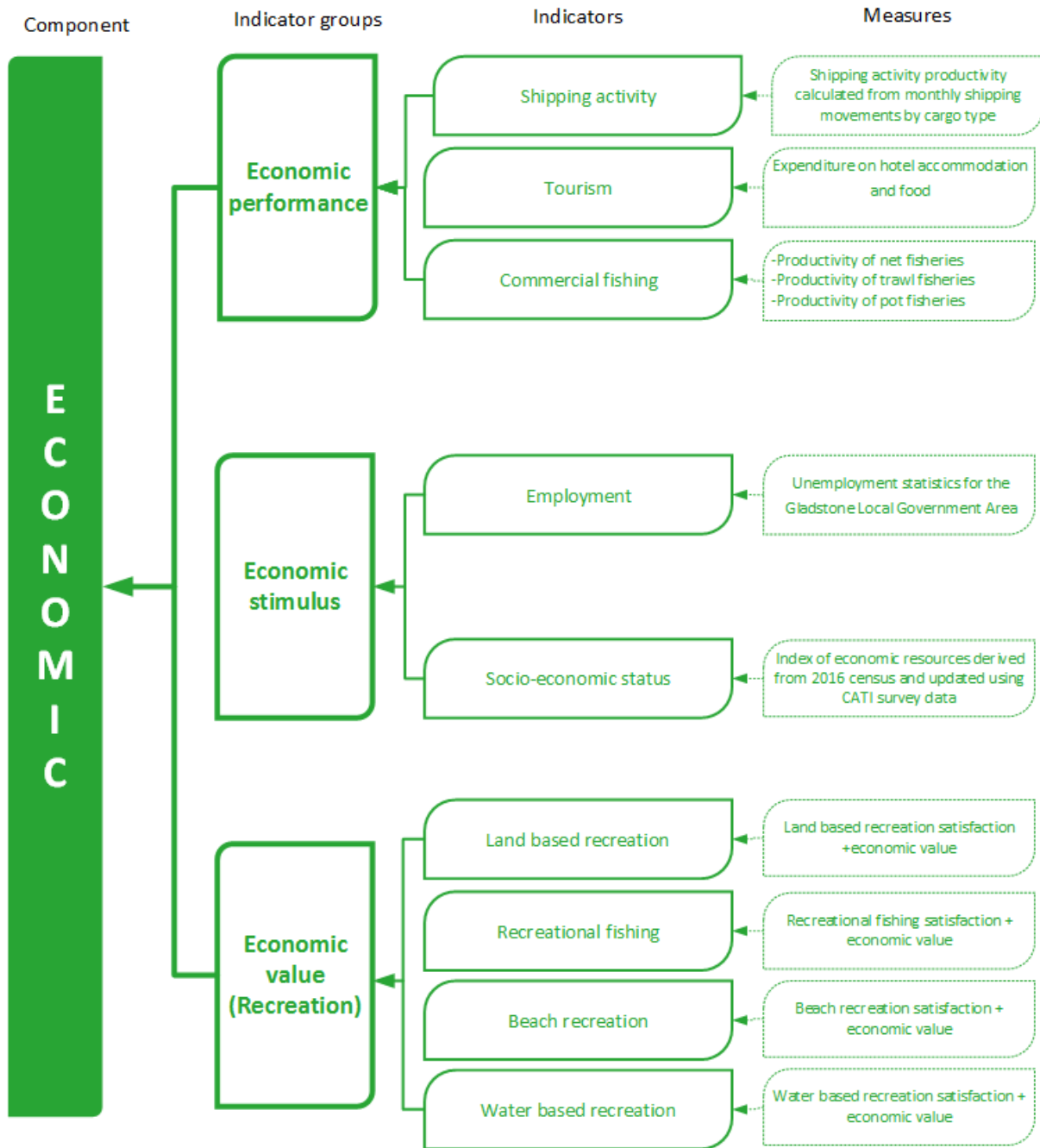
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Appendix A. Assessment criteria: indicators and aggregation levels







Appendix B. Community survey

GHHP social, cultural and economic indicators survey questions

To be read to respondents:

Hello! My name is _____

We are calling you today to request your participation in a survey on the social and economic status of Gladstone Harbour. The project is funded by the Gladstone Healthy Harbours Partnership, and is being run by CQUniversity. We would like to ask you about your use of the Harbour and your perceptions about the harbour quality. The information will be presented in a report card on the health of the harbour, along with other information about the environmental status. This will help managers to make better decisions about how the harbour is managed.

The survey will take about 15 mins to complete. Your participation is entirely voluntary and you are free to not answer any questions that you would prefer not to. All of your responses will remain strictly confidential.

Would you be happy to participate in this survey? Do you have any questions at this stage?

Age and gender segmentation questions Q64 and Q65 here

Q1. Do you live in the Gladstone region? Yes/No (*screening question*)

Q2. In what suburb, town, or locality of the Gladstone region do you live? _____

Q3. How long have you lived in the Gladstone region?

Q3y. _____ (years) Q3m. _____ (months)

Q4. Do you own a boat? Yes/No

We will be asking you a number of questions about your use of Gladstone harbour and the surrounding areas. The area that we are interested in includes the coast and waters up to the Narrows, including Graham Creek, to the north, and extending south to Tannum Sands

and Colosseum Bay. To the east it extends just past the east coast of Facing Island. We will call this the Gladstone Harbour area from now on.

Q5. When you think of the Gladstone Harbour area what are the first three words that come into your mind _____ (exclude uninformative words e.g. the, it, like, well and plural words)

In this section of the survey we are going to ask you some questions about how you use the Gladstone Harbour area for recreation. We are going to ask you about four different types of recreational activity. The first relates to your use of beaches, the second to other shore-based activity, the third to recreational fishing (both from land and from a boat) and the fourth to other (non fishing) water-based recreation.

Q6a. In the previous 12 months, did you visit the Gladstone Harbour area at all? _____
Yes/No

Q6b. If yes: were any of these visits for recreation (not including visits where you paid a tour or ferry operator)? _____ Yes/No

Q7. In the previous 12 months, do you think you used the Gladstone harbour area for any recreation activity more or less often than the year before, or about the same? _____
More/ less / about the same

Q8. In the previous 12 months, how frequently did you use a boat ramp in the Gladstone Harbour area? *Please read out the list of categories (LHS).and record a single response in one of the two columns (some people might know the exact amount which is why we have provided the ranges) These instructions apply to all the frequency questions.*

Response category	Range	
Never		0
4-7 times a week		150-300
2-3 times a week		80-149
About once a week		40-79
About once every 2 weeks		20-39
About once a month		7-19
About 4-6 times a year		4-6
3 times per year		3
2 times per year		2
About once a year		1

Q9. In the previous 12 months have you visited the following beaches in the Gladstone Harbour area?

	Y/N
Barney Point	
Spinnaker Park artificial beach	
Boyne Is	
Tannum Sands	
Other (please specify)	

Q10. In the previous 12 months, how often have you visited a **beach** on the mainland in the Gladstone Harbour area? For example, Barney Point, Spinnaker Park artificial beach, Boyne Is, Tannum sands. Do not consider beaches further south than Tannum Sands.

Response category	Range	
Never	0	
4-7 times a week	150-300	
2-3 times a week	80-149	
About once a week	40-79	
About once every 2 weeks	20-39	
About once a month	7-19	
About 4-6 times a year	4-6	
3 times per year	3	
2 times per year	2	
About once a year	1	

Q11b. Thinking of the **last trip you made to a beach** in the Gladstone Harbour area, how satisfied were you overall with your experience? On a scale for 1 to 10 where 1= very unsatisfied to 10= very satisfied.

Very unsatisfied									Very satisfied
1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q13. In the last 12 months did you undertake any of the following other **shore-based activities** in the Gladstone Harbour area?

(Read the following list and get a yes/no response)

	Y/N
Walking	
Cycling	
Running	
Picnicking or barbecuing	
Relaxing by the water	
Sporting events	

Community events	
Other (specify)	

Q14. In the last year, how often have you done **other shore-based recreation** in the Gladstone Harbour area?

Response category	Range
Never	0
4-7 times a week	150-300
2-3 times a week	80-149
About once a week	40-79
About once every 2 weeks	20-39
About once a month	7-19
About 4-6 times a year	4-6
3 times per year	3
2 times per year	2
About once a year	1

Q15b. Thinking of the **last shore-based recreation trip** you made in the Gladstone Harbour area, how satisfied were you overall with your experience? *On a scale for 1 to 10 where 1= very unsatisfied to 10= very satisfied.*

Very unsatisfied										Very satisfied
1	2	3	4	5	6	7	8	9	10	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

We would now like you to think about any **water-based activity** you may have undertaken in the Gladstone harbour and surrounding area in the last year, **but not counting fishing trips (where fishing was the primary purpose)**. We are interested in trips for boating, water-sports, swimming etc. We ask about fishing trips next.

We do not want you to include trips on the ferry or commercial boat cruises or other activities where you paid a commercial operator. We are also only interested in trips where you spend the majority of the trip in the Gladstone Harbour area. We are not interested in trips where you travelled through the harbour to get to somewhere else.

In the last 12 months, did you undertake any of the following water-based activities in the Gladstone Harbour area?

(Read the following list and get a yes/no response)

	Y/N
Motorised boating –general boat recreation	
Motorised water sports (e.g., water skiing, jet-skiing)	
Non-motorised water sports (e.g. Kayaking, kite surfing, paddle boarding, rowing, windsurfing)	
Sailing	
Swimming (but not from a beach)	
Scuba or snorkelling	
Other(specify)	

Q12a1. If YES how often have you done **water-based recreation** in the Gladstone Harbour area? *Frequency table*

Q12B1: Thinking of the last **water-based recreation trip (not recreational fishing)** to the Gladstone Harbour area, how satisfied were you overall with your experience? *On a scale for 1 to 10 where 1= very unsatisfied to 10= very satisfied.*

Very unsatisfied									Very satisfied
1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

We would now like you to think about any recreational fishing trips you may have undertaken in the Gladstone harbour and surrounding area in the last year. We do not want you to include commercial trips where you paid a commercial operator. We are also only interested in trips where you spend the majority of the trip in the Gladstone Harbour area. We are not interested in trips where you travelled through the harbour to get to somewhere else.

Q11. In the last 12 months, did you undertake any **recreational fishing** trips, either shore-based or boat based, in the Gladstone Harbour? YES/NO

If no jump to Q26

Q11a. If YES how often have you been **recreational fishing** in the Gladstone Harbour area?

Response category	Range
Never	0
4-7 times a week	150-300
2-3 times a week	80-149
About once a week	40-79
About once every 2 weeks	20-39
About once a month	7-19
About 4-6 times a year	4-6
3 times per year	3
2 times per year	2
About once a year	1

Q25. Thinking of the last recreational fishing trip to the Gladstone Harbour area, how satisfied were you overall with your experience? *On a scale for 1 to 10 where 1= very unsatisfied to 10= very satisfied.*

Very unsatisfied				Very slightly unsatisfied	Very slightly satisfied				Very satisfied
1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q16. Thinking back to the **last time** you went fishing in the Gladstone harbour area, how did you get to where you first accessed the Gladstone harbour area from your home? i.e. What form of transport did you use? (more than one response allowed)

Walk	
Bicycle	
Motor vehicle	
Other	

Q17. Approximately how many kilometres is it from your home to where you first accessed the harbour? _____ kms

Q18. Approximately how long did it take to get there (one way) _____ hrs _____ mins

Q19. How many people did you go with? Count only those, including yourself, in the same vehicle as you.

- a.No of adults (including yourself)
- c.No of children (16 yrs and under)

Q20. Approximately how long did your recreational activity last? _____ hrs (use proportion if required)

Q21a. Did you spend most of your time doing this activity or do other activities as well such as shopping or visiting friends?

Q21b. Spent most of the time doing this activity	s/No
If you did other things as well , approximately what proportion of your time was spent doing the recreational activity <i>Do not include travel time</i>	of time

Q22. Did your activity involve the use of a boat _____ Yes/ No

If no jump to Q.26

Q23. Approximately how many kms or nautical miles did you travel by boat?

Q23k.kms _____ or

Q23m.Nautical miles _____

Q24.Roughly how many Litres or \$ worth of fuel did you use?

Q24l. L _____ or

Q24d. \$ _____

We are now going to ask you a few questions about the recreational facilities around the Gladstone harbour area.

Do you agree or disagree with the following statements on a scale from 1 to 10 with 1=strongly disagree to 10=strongly agree (also allow a don't know or non response)

	Strongly									Strongly	No
	1	2	3	4	5		7	8	9	10	
Q26.I am satisfied with the level of access to public spaces around Gladstone Harbour											
Q27.I am satisfied with the number of boat ramps available in the Gladstone Harbour area											
Q28.I am satisfied with the quality of boat ramps, available in the Gladstone Harbour area											
Q28a. I am satisfied with facilities associated with boat ramps in the Gladstone Harbour area											
Q29.I have fair access to Gladstone Harbour compared to other users of the harbour											
Q30.There are other places that are better than the Gladstone Harbour area for the recreational activities that I do											
Q32.The amount of recreational boating activity in Gladstone Harbour has reduced my use of the area											
Q31.The amount of commercial shipping in Gladstone Harbour has reduced my use of the area											

We are now going to ask you some more general questions about your impression of the Gladstone harbour area.

Do you agree or disagree with the following statements on a scale from 1 to 10 with 1=strongly disagree to 10=strongly agree (also allow a don't know or non response)

With 1=strongly disagree to 10=strongly agree	Strongly									Strongly	No
	1	2	3	4	5	6	7	8	9	10	
Q33.The Gladstone Harbour area is not in great condition											
Q34.I feel optimistic about the future health of Gladstone Harbour											
Q35.The health of the harbour has improved in the past 12 months											
Q36.Marine debris and litter is not a problem in Gladstone Harbour											
Q37.The amount of marine debris and litter in Gladstone Harbour affects my access to the area											

With 1=strongly disagree to 10=strongly agree	Strongly									Strongly	No Answer
	1	2	3	4	5	6	7	8	9	10	
Q40. I think water quality in Gladstone Harbour is in good condition											
Q41..I think air quality in Gladstone Harbour is in good condition											
Q42. The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months											
Q43. I would be happy to eat seafood caught in the Gladstone Harbour area											
Q44. I feel safe being in the Gladstone Harbour area at night											

With 1=strongly disagree to 10=strongly agree	Strongly									Strongly	No Answer
Q45. Gladstone Harbour makes living in Gladstone a better experience											
Q45a. I enjoy going to the harbour because it is beautiful to look at											
Q45b I enjoy going to the harbour because of its natural beauty											
Q46. I rarely participate in community events in the Gladstone Harbour area											

We are now going to ask you some questions about your general perceptions on how the harbour is managed and how important it is to you.

Do you agree or disagree with the following statements (1-10)?

With 1=strongly disagree to 10=strongly agree	Strongly									Strongly	No Answer
Q47. I feel able to have input into the management of the Gladstone Harbour if I choose to											
Q50. I feel proud that I live in the Gladstone community											
Q51. The Gladstone Harbour area is part of who I am											
Q52. The Gladstone Harbour area improves my quality of life											
Q53. I do not plan to be a resident of this region in the next 5 years											
Q54. The Gladstone Harbour is a key part of the Gladstone community											

We are now going to ask you questions about what you value about Gladstone harbour. Do you agree or disagree with the following statements (1-10)?

With 1=strongly disagree to 10=strongly agree	Disagree	1	2	3	4	5	6	7	8	9	10	Agree	No
Q55. I value the Gladstone Harbour area because it supports a variety of marine life													
Q56. I value the Gladstone Harbour area because it provides opportunities for outdoor recreation													
Q57. I value the Gladstone Harbour area because it attracts visitors to the region													
Q58. The Gladstone Harbour area is a great asset for the economy of this region													
Q59. The Gladstone Harbour area is a great asset for the economy of Queensland													
Q60. I value the Gladstone Harbour area because I enjoy the scenery and sights													
Q61. I value the Gladstone Harbour area because there are spiritually special places													
Q62. I value the Gladstone Harbour area because there are culturally special places													
Q63. I value the Gladstone Harbour area because it has historical significance that matters to me													

ECONOMIC AND DEMOGRAPHIC

We are now going to ask some questions about you and your household. This is to help us compare your responses with other studies in the area and also other respondents.

Q64. What is your age?

18-24	25-34	35-44	45-54	55-64	65+
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q65. Are you male or female?

Q66. Do you identify as a traditional owner of the area? Yes No

Q67A. What is the highest level of education you have obtained?

- Year 11 or below
- Year 12
- Certificate (III or IV)/ Trade certificate
- Diploma Level or Advanced Diploma
- Bachelor degree
- Graduate Certificate or Graduate Diploma
- Postgraduate degree(Masters or PhD)
- Other (please specify)

Q67. What is your approximate household income (before tax)?

code	1	2	3	4	5	6	8	9
weekly	≤\$499	\$500 - \$999	\$1000 - \$1499	\$1500 - \$1999	\$2000 - \$2499	\$2500 - \$3499	≥\$3500	Not answered
Annual	≤\$25,999	\$26,000- \$51,999	\$52,000- \$77,999	\$78,000- \$103,999	\$104,000- \$129,999	\$130,000- \$181,999	≥\$182,000	

Q68. How many adults (> 18 years old) live in your household?

Q69. How many children 15 years and over (but under 18) live in your household?

Q70. How many children younger than 15 years old live in your household?

Q71. Is any adult in the household unemployed? (exclude stay at home mums/dads not actively seeking work, or retirees) Yes No

Q72. Is any adult in the household self employed? Yes No

Q73. Is your home:

Owned with a mortgage?	Owned without a mortgage?	Rented?
------------------------	---------------------------	---------

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Q73a. If owned with a mortgage, is your mortgage repayment greater than **\$2800/month**

Yes No

Q73b. If rented, is your rent payment greater than **\$215/week**

Yes No

Q74. Does your household have a car? Yes No

Q75. How many bedrooms does your house have?

Final questions: and then thank them for their participation

Q76. This survey will be conducted on an annual basis to collect information for the Gladstone harbour report card. Would you be willing to be contacted again next year to answer some more questions about the Gladstone harbour.

If yes, please collect an email address. _____

That is the end of the survey

Combined results from the surveys will help ensure the opinions of the people living in the Gladstone area are considered in the management of the harbour. You will be able to access the final report online at the end of the year. If you wish to receive further information about the survey, I can give you the contact details for the project leader, Dr Jill Windle from CQUniversity, who can forward further details to you. Would you like these? (if yes then provide email j.windle@cqu.edu.au)

Thank you for your participation

Appendix C. CATI survey results for social and cultural measures

C1 Social component

Three social indicator groups were measured with information collected in the CATI survey; Harbour usability, Harbour access and, Liveability and wellbeing. Most responses to the survey questions were based on a 10 point scale denoting either a level of satisfaction (1=Very unsatisfied to 10=Very satisfied) or a level of agreement (1=Strongly disagree to 10=Strongly agree). The survey results are outlined for each of these indicator groups in turn below.

C1.1 Harbour usability

Harbour usability was assessed across three indicators; Satisfaction with harbour recreational activities (questions 11b, 15b, 25, 12b1, 28 and 28a), Perceptions of air and water quality (questions 40, 41 and 42), and Perceptions of harbour safety (questions 44 and 43 plus data from Marine Safety Queensland). Analyses of each CATI derived indicators are presented below.

C1.1.1 Satisfaction with harbour recreational activities

The level of satisfaction (1=Very unsatisfied to 10=Very satisfied) with recreational activities was relatively high with mean rating levels of 8.22, 8.26, 7.36 and 8.13 for beach, other land-based, fishing and other water-based recreation respectively (Figure C1.1). There was no statistically significant change from last year.

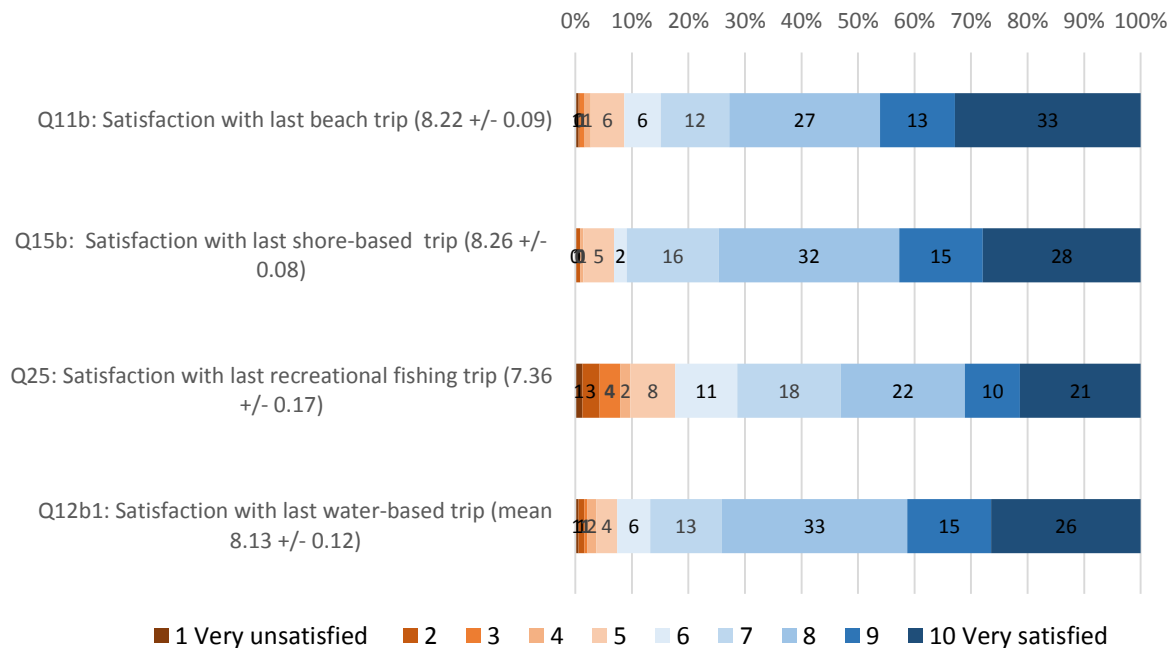


Figure C1.1: Satisfaction with last beach, shore-based, fishing and water-based recreational trip

Satisfaction with the quality of boat ramps in the harbour area was high (mean 7.73, SE 0.11) while satisfaction with the facilities offered at the boat ramps was slightly lower (mean 7.20, SE 0.11), see Figure C1.2.

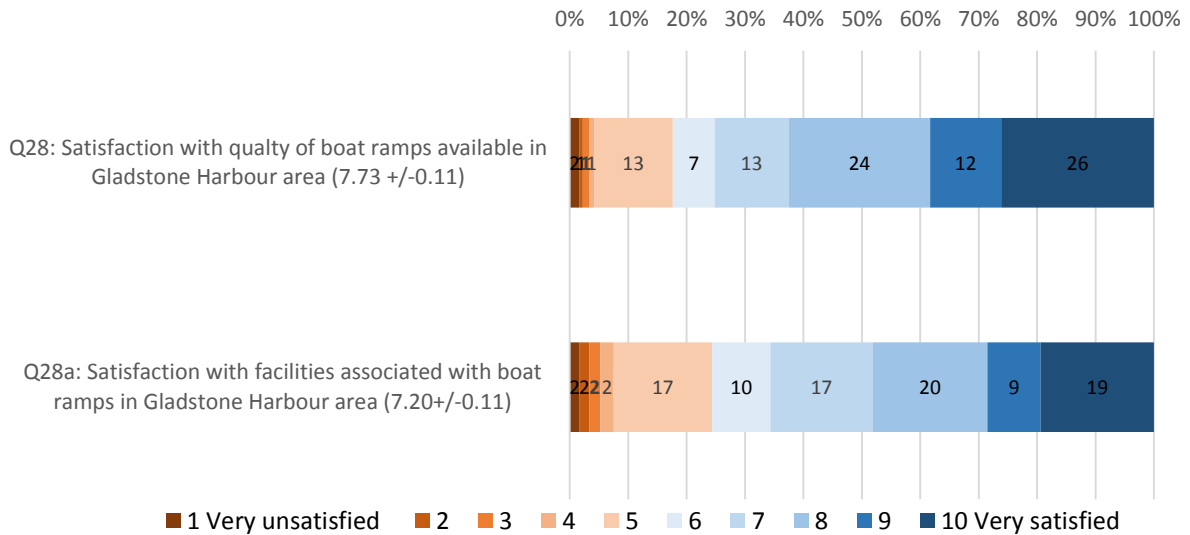


Figure C1.2: Satisfaction with the quality of boat ramps and the facilities

C1.1.2 Perceptions of air and water quality

Opinions of air and water quality were assessed via three CATI questions “I think water quality in Gladstone Harbour is in good condition”, “I think air quality in Gladstone Harbour is in good condition” and “The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months”. All three questions were answered on a scale from 1=Strongly Disagree to 10=Strongly Agree with higher scores indicates higher endorsement of air/water quality.

While water quality does not appear to have affected use of the harbour in the past 12 months for most respondents (mean 7.03, SE 0.15), overall agreement that water quality is in good condition was more moderate (mean 6.57, SE 0.13). Opinions of air quality were lower (mean 5.15, SE 0.15). The distribution of responses across the three questions is presented in Figure C1.3.

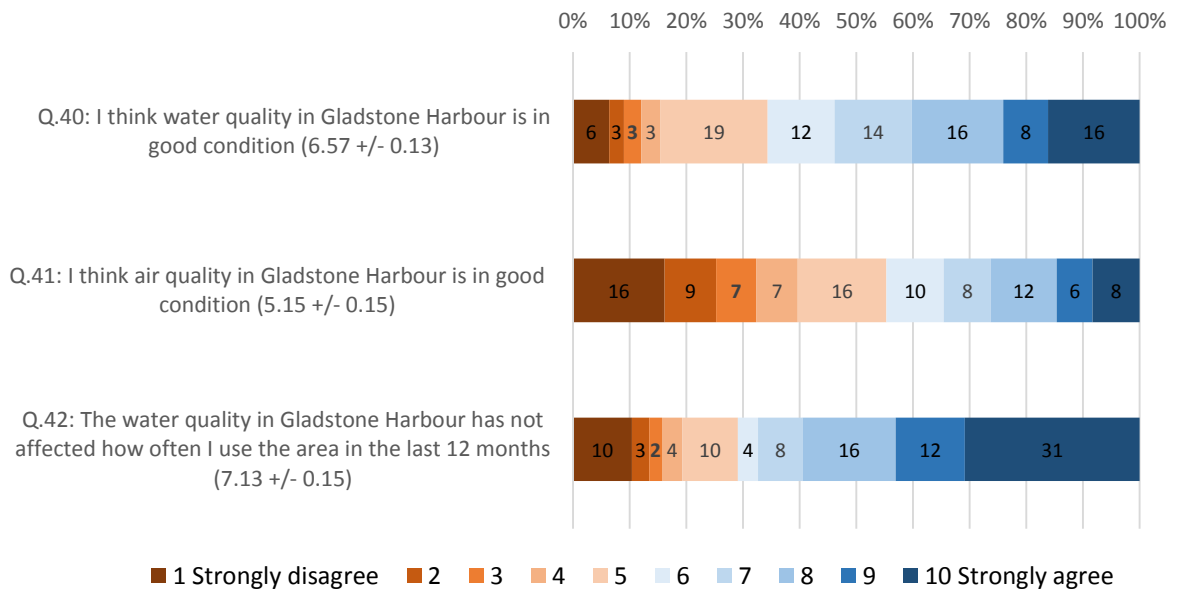


Figure C1.3: Opinions of air and water quality and the effect on usage

C1.1.3 Perceptions of harbour safety for human usage

The distribution of responses to two CATI questions ‘I feel safe being in the Gladstone Harbour area at night’ and ‘I would be happy to eat seafood caught in the Gladstone Harbour area’ are reasonably positive with details presented in Figure C1.4.

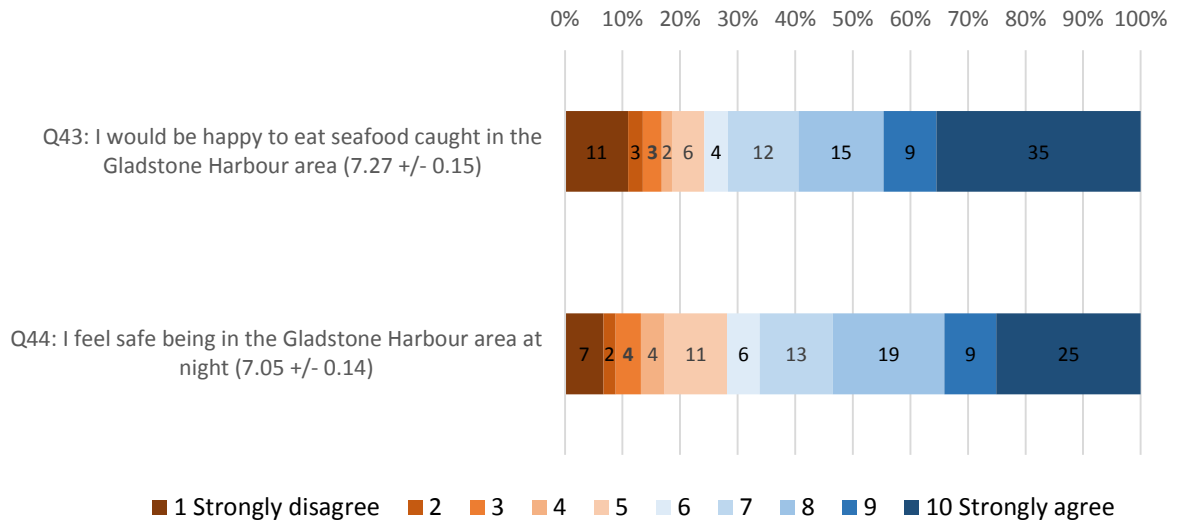


Figure C1.4: Endorsement of feeling safe and eating seafood caught in the Gladstone Harbour area

C1.2 Harbour access

Harbour access was assessed across four indicators; Satisfaction with access to the harbour (questions 29), Satisfaction with boat ramps and public spaces (questions 8, 26 and 27), Perceptions of harbour health (questions 33, 34 and 35) and Perceptions of barriers to access (questions 31, 32, 36 and 37). Details are presented below.

C1.2.1 Satisfaction with access to the harbour

Respondents indicated high levels of agreement with the statement ‘I have fair access to Gladstone Harbour’ (mean 7.84, SE 0.10) (Figure C1.5).

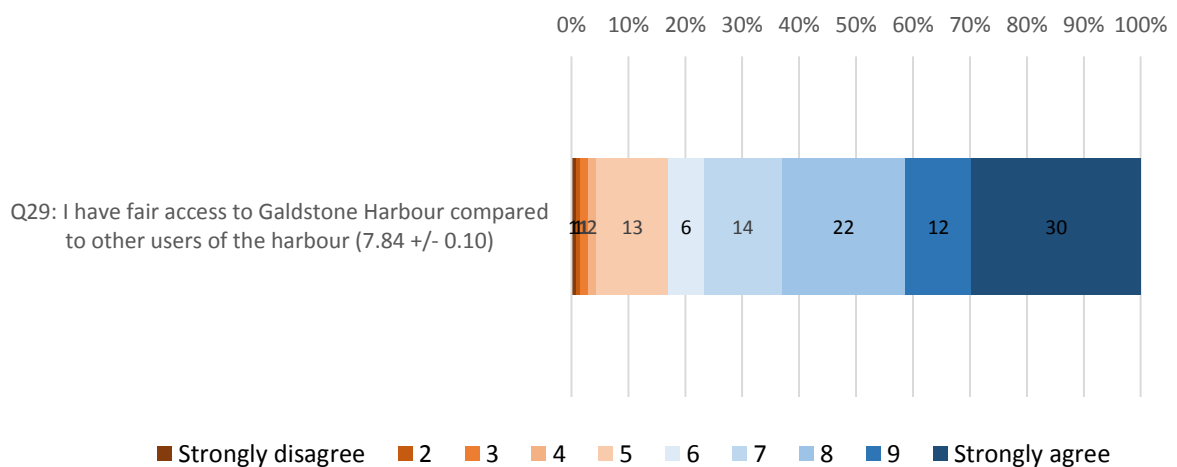


Figure C1.5: Perceptions of fair access to Gladstone Harbour

C1.2.2 Satisfaction with boat ramps and public spaces

Frequency of boat ramp use in the past 12 months (Q8) is presented in Figure C1.6. The majority of respondents had never used a boat ramp (60%), but the average use by the 40% who had used the ramps was 22 times a year. Across the full sample, the average use was nine times per year. (The same category averages were applied as presented in Appendix D: Table D1 in the recreational activity results section).

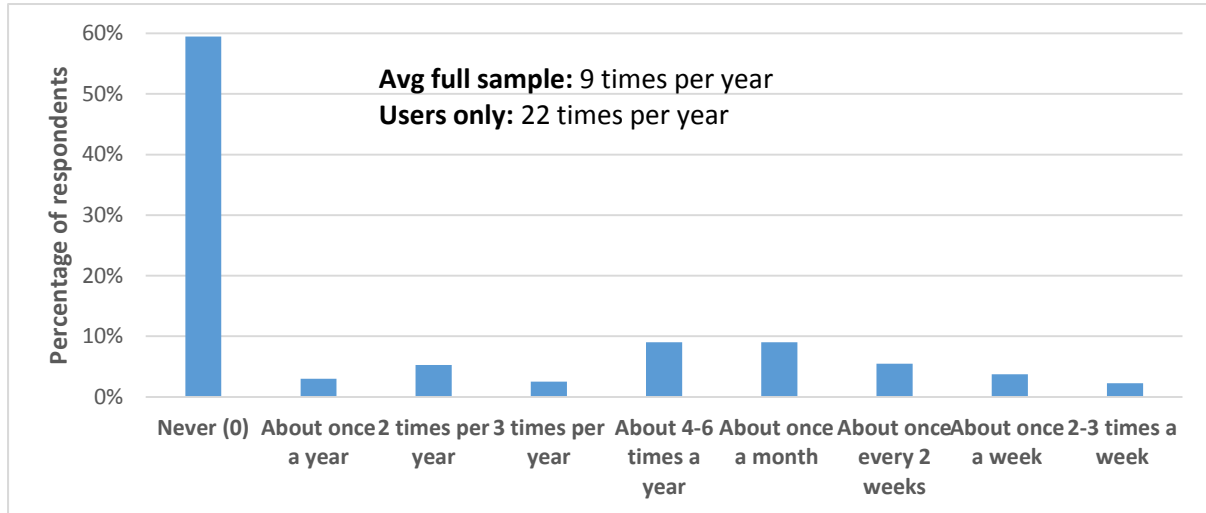


Figure C1.6: Frequency of boat ramp use in the past 12 months

Respondents were also asked about their satisfaction with the number of boat ramps available and the level of access to public spaces around the harbour. Overall satisfaction ratings for both questions were high with most respondents falling in the ‘agree’ to ‘strongly agree’ categories (Figure C1.7).

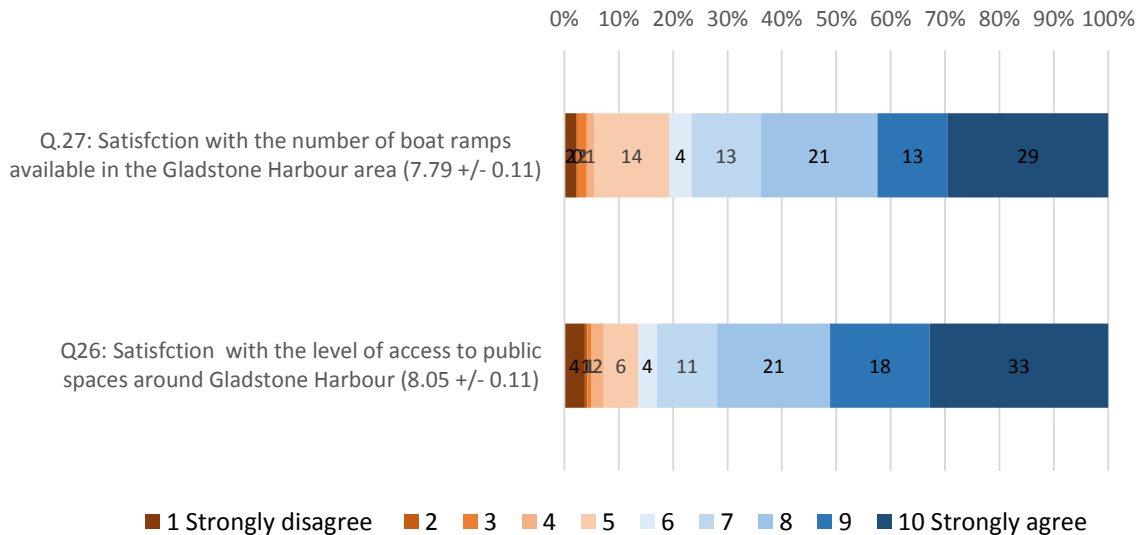


Figure C1.7: Satisfaction with number of ramps and access to public spaces

C1.2.3 Perceptions of harbour health

In order to facilitate analyses and ease of reporting CATI question 33 ‘The Gladstone Harbour area is not in great condition’ was re-coded so that ratings could be compared across the three measures in this indicator. The wording of question 33 has been presented as ‘The Gladstone Harbour area is in great condition’ in line with the re-coding, indicating a positive perception of harbour health. Respondents indicated overall impressions of the Gladstone Harbour area condition (mean 7.24, SE 0.13), their level of optimism for the future health of the harbour (mean 6.93, SE 0.13) and whether they thought the health of the harbour had improved over the past 12 months (mean 6.53, SE 0.12). Across all three questions, responses were skewed to the positive end of the scale as can be seen in Figure C1.8.

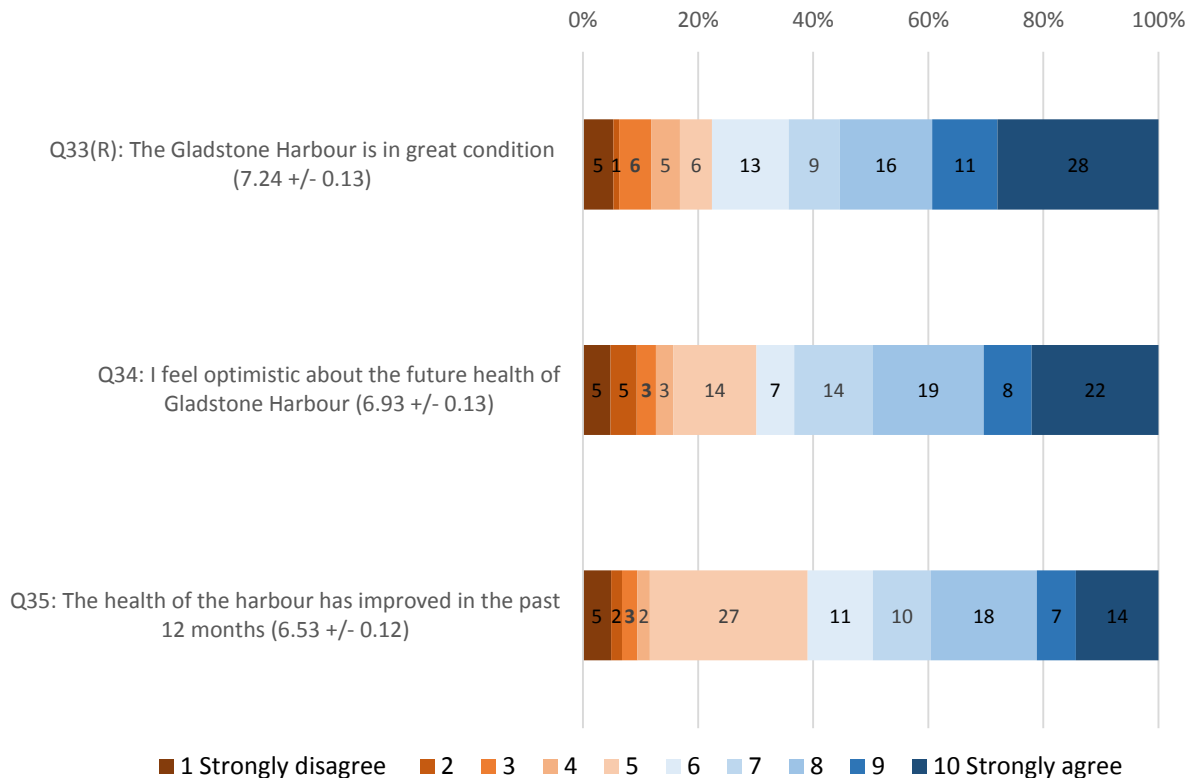


Figure C1.8: Perceptions of harbour condition, future health and improvements over last 12 months

C1.2.4 Perceptions of barriers to access

In order to facilitate analyses and ease of reporting CATI question 36 ‘Marine debris and litter is not a problem in Gladstone Harbour’ was re-coded so that ratings could be compared across the four measures in this indicator. Figure C1.9 presents the overall pattern of responses to the four measures. Note that the wording of question 36 has been presented as ‘Marine debris and litter is a problem in Gladstone Harbour’ in this figure. For this group a rating of 1 (on the 10 point response scale) indicates strong disagreement with the statement and highlights that debris, shipping and recreational boats are not impacting on access to the harbour. The strong skew seen (towards disagree) is particularly apparent for the last three questions. There is a more even distribution of responses in relation to the problem of marine debris.

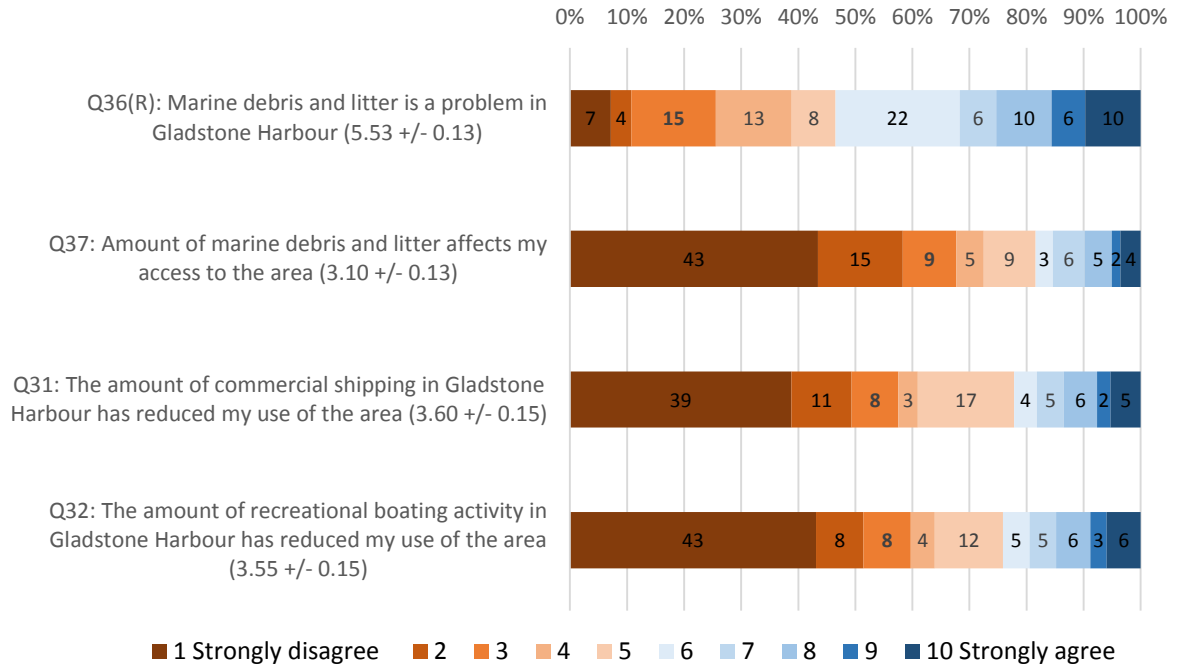


Figure C1.9: Opinions regarding marine debris, levels of shipping and recreational boating

C1.3 Liveability and wellbeing

Liveability and wellbeing was assessed through one indicator (Contribution of harbour to liveability and wellbeing) and four measures (CATI questions 45, 45a, 45b and 46). For the first time in 2018 two new measures were introduced to account for the natural beauty and aesthetic value of the harbour. Analyses of these are presented below.

C1.3.1 Contribution of harbour to liveability and wellbeing

In order to facilitate analyses and ease of reporting question 46 ‘I rarely participate in community events in the Gladstone Harbour area’ was re-coded so that ratings could be compared across the four measures in this indicator. The wording of question 46 has been presented as ‘I regularly participate in community events in the Gladstone Harbour area’ to reflect the recoding. Figure C1.10 presents the overall pattern of responses. For all questions a higher number indicates greater engagement with, and appreciation of, harbour-related activities. As is apparent in the figure, respondents showed a relatively high endorsement of the contribution of the harbour to liveability and wellbeing but participation in community events returns a lower rating score.

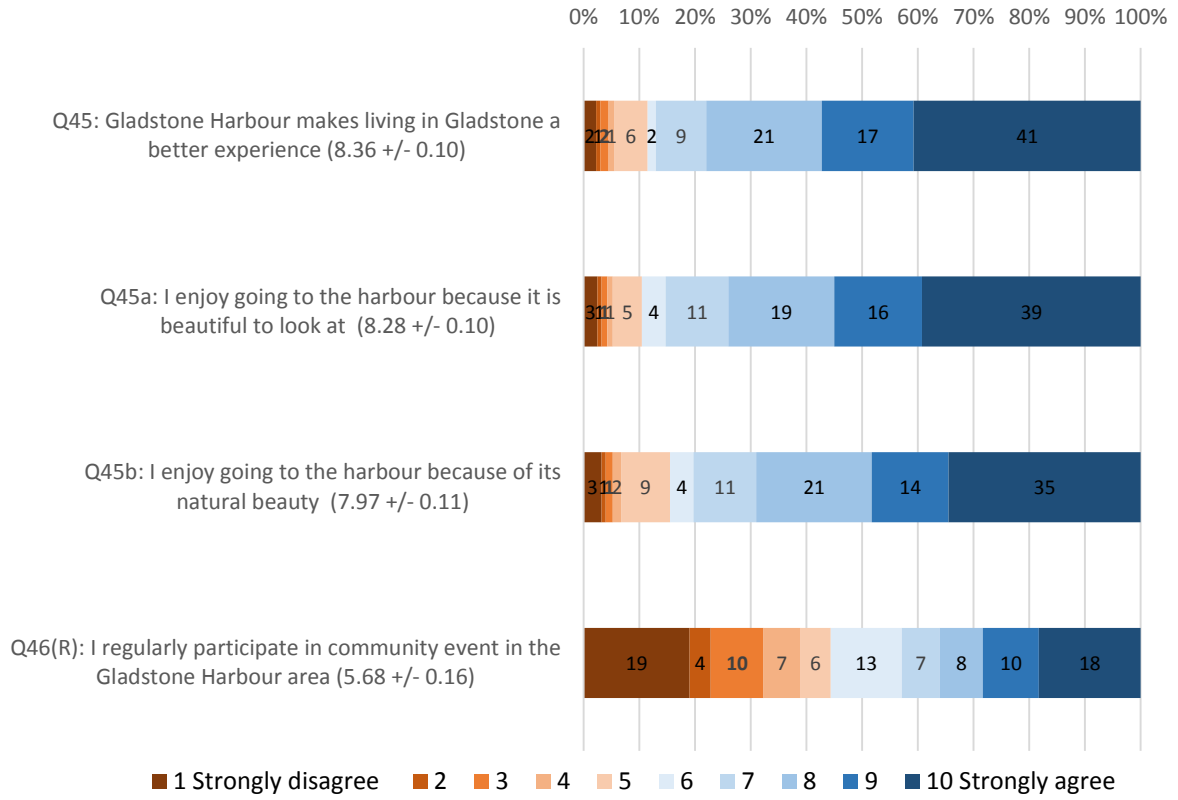


Figure C1.10: Liveability and participation in community events

C2 Cultural component: Sense of place indicator group

Only one indicator group, 'Sense of place', is assessed in this project for the cultural component. The six indicators in this group are all assessed via CATI questions.

- Distinctiveness (questions 30 and 51)
- Continuity (questions 3 and 53)
- Self-esteem (questions 50)
- Self-efficacy (questions 52 and 47)
- Attitudes to Gladstone Harbour (questions 54, 58 and 59)
- Values of Gladstone Harbour (questions 55, 56, 57, 60, 61, 62 and 63)

Analyses of each of these indicators follows.

Sensitivity testing (Independent Samples T-Test at the 5% level) was conducted to determine whether respondents who identified as being a Traditional Owner had significantly different scores from the rest of the sample.

The sample included 41 respondents (10%) who identified as being a Traditional Owner of the area. This is higher than the population of 3.5% of Indigenous people in the region, but lower than the proportion recorded in previous years (e.g., 13.5% in 2017). There was a significant difference in the responses of Traditional Owners to five-of the 17 questions (9/17 in 2017). Three of the five differences related to the Values indicator with significantly higher scores for the spiritual, cultural and historical importance questions. The other differences, with significantly lower scores, related to the Distinctiveness (no better place) and Attitude (local asset) indicators. Full details are outlined in each section below.

C2.1 Distinctiveness

In order to facilitate analyses and ease of reporting CATI question 30 'There are other places that are better than the Gladstone Harbour area for the recreational activities that I do' was re-coded so that ratings could be more easily compared across the two measures in this indicator. Figure C2.1 presents the overall pattern of responses to these questions. Note that the wording of question 30 has been presented as 'There is no place better than the Gladstone Harbour area for the recreational activities that I do' to reflect the recoding. For both questions, a higher score indicates greater engagement with, and appreciation of, the harbour-related activities.

The pattern of responses is relatively evenly distributed across the scale for both measures, with a slightly higher level of respondent agreement that the harbour is part of their identity.

Respondents who identified as Traditional Owners were less likely to agree that there was 'no better place' (Q30) with lower mean scores (4.73 vs 5.84; $p=0.027$). There was no significant difference ($p=0.783$) in the means scores for 'part of who they are' Q51.

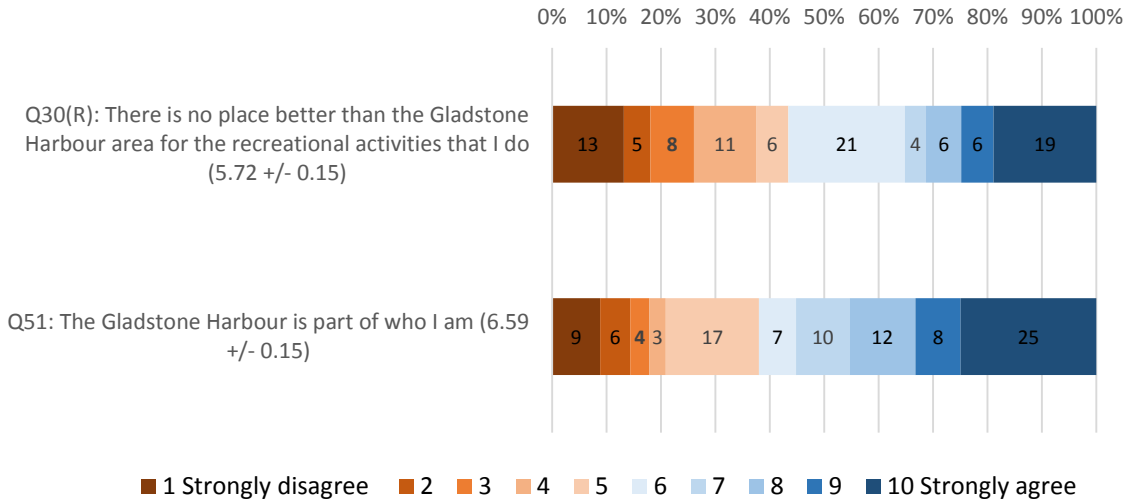


Figure C2.1: Measures of distinctiveness

C2.2 Continuity

Two measures were applied for this indicator: the length of time people had lived in the area and whether they planned to stay for the next five years. Time spent living in the Gladstone Harbour region ranged from less than a year (minimum 3 months) through to 74 years (average 20 years). Given the range of values, time spent in the area was categorised into 10 year bands (<1 to 9 years; 10-19 years etc) and the relative frequency of each category is presented in Figure C2.2. As can be seen below the largest proportion of respondents (55%) fell in the <1 to 9 years and 10-19 year cohorts.

There was no significant difference ($p=0.635$) in length of residency between Traditional Owners and the rest of the sample.

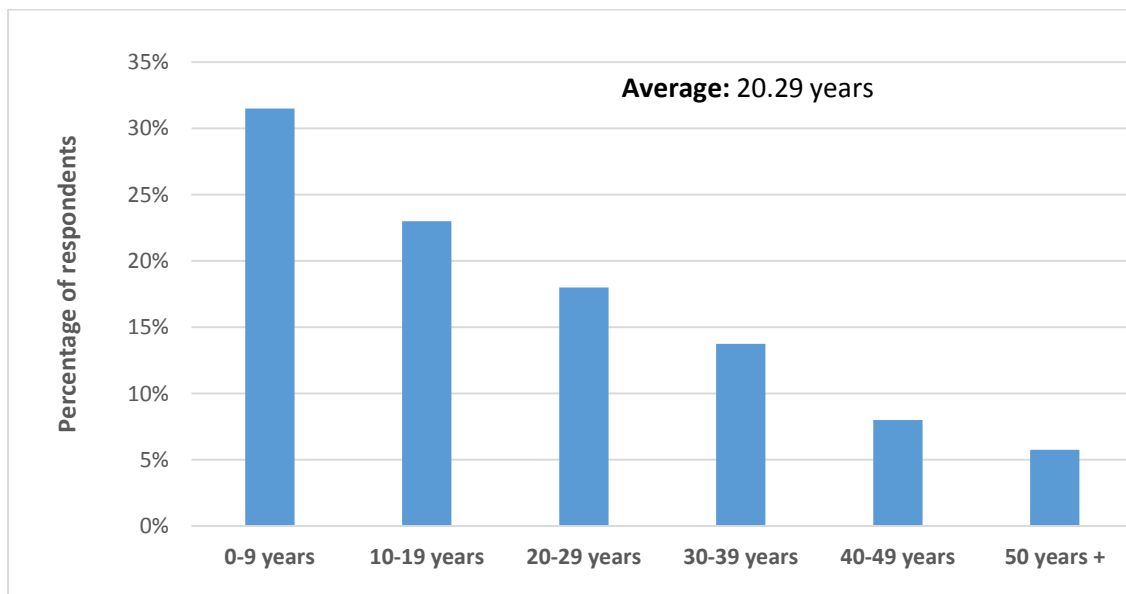


Figure C2.2: Time spent living in the Gladstone Harbour area

In order to facilitate analyses and ease of reporting CATI question 53 ‘I do not plan to be a resident of this region in the next 5 years’ was re-coded to facilitate interpretation – thus a higher average indicates greater intention to remain in the area for the immediate future. Figure C2.3 presents the overall pattern of responses to the question. Note that the wording of question 53 has been presented as ‘I do plan to be a resident of this region in the next 5 years’ to reflect the recoding.

There was no significant difference ($p=0.704$) in the intention to remain in the area between Traditional Owners and the rest of the sample.

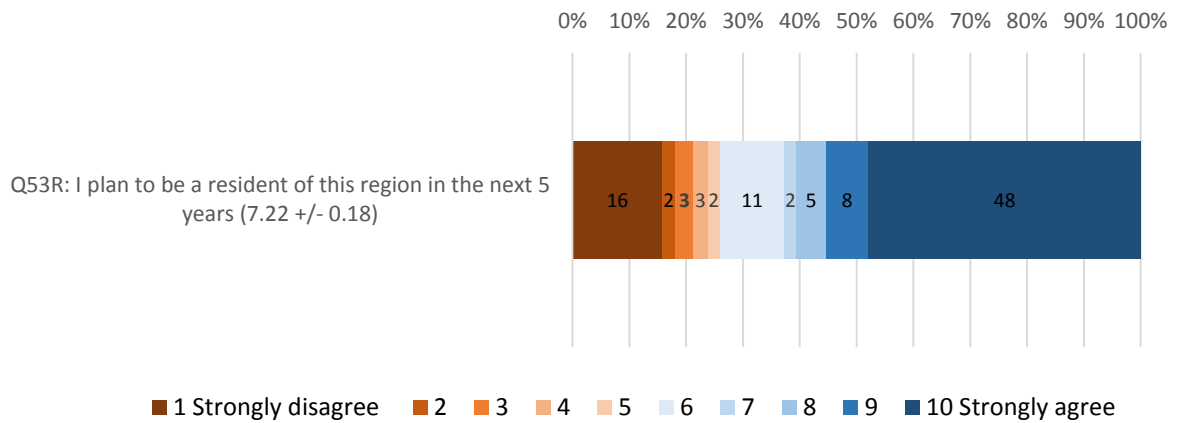


Figure C2.3: Intention to remain in the Gladstone Harbour area for the next 5 years

C2.3 Self-esteem

The distribution of responses to the Self-esteem question ‘I feel proud that I live in the Gladstone community’ is presented in Figure C2.4, and there is a strong skew towards ‘Strongly agree’ with a high average endorsement (mean 7.99; SE 0.11).

There was no significant difference ($p=0.479$) between Traditional Owners and the rest of the sample.

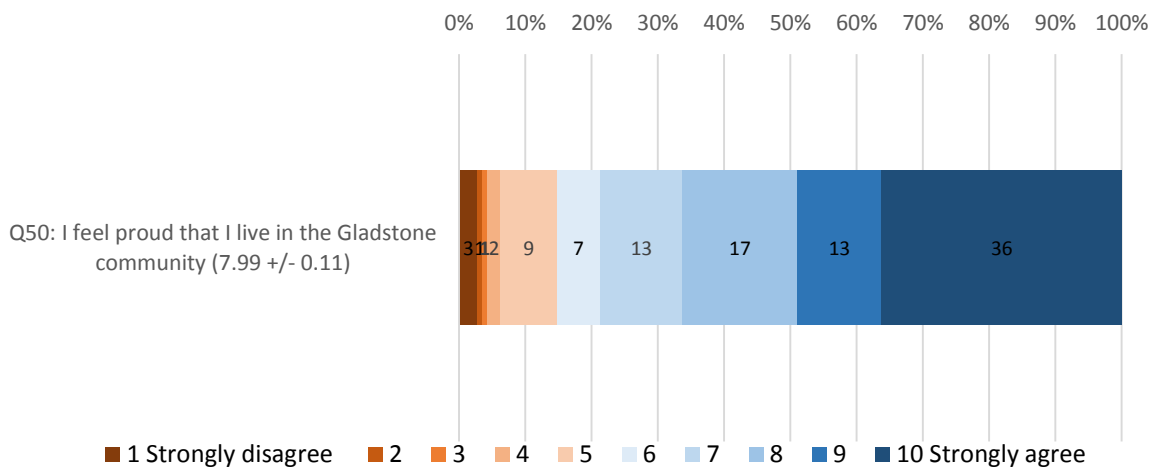


Figure C2.4: Measure of Self-esteem

C2.4 Self-efficacy

Self-efficacy was evaluated via two CATI questions. Responses toward the first (The Gladstone Harbour area improves my quality of life) were skewed towards the strongly agree end of the response scale (Figure C2.5) with a mean score of 7.03 highlighting the positive effect of the area on respondent quality of life

Responses to the second question (I feel able to have input into the management of the Gladstone Harbour if I choose to) are relatively evenly distributed across the scale with the average response in the middle (5.75).

There was no significant difference between Traditional Owners and the rest of the sample in responses to either question (p=0.208 and p=0.546 respectively).

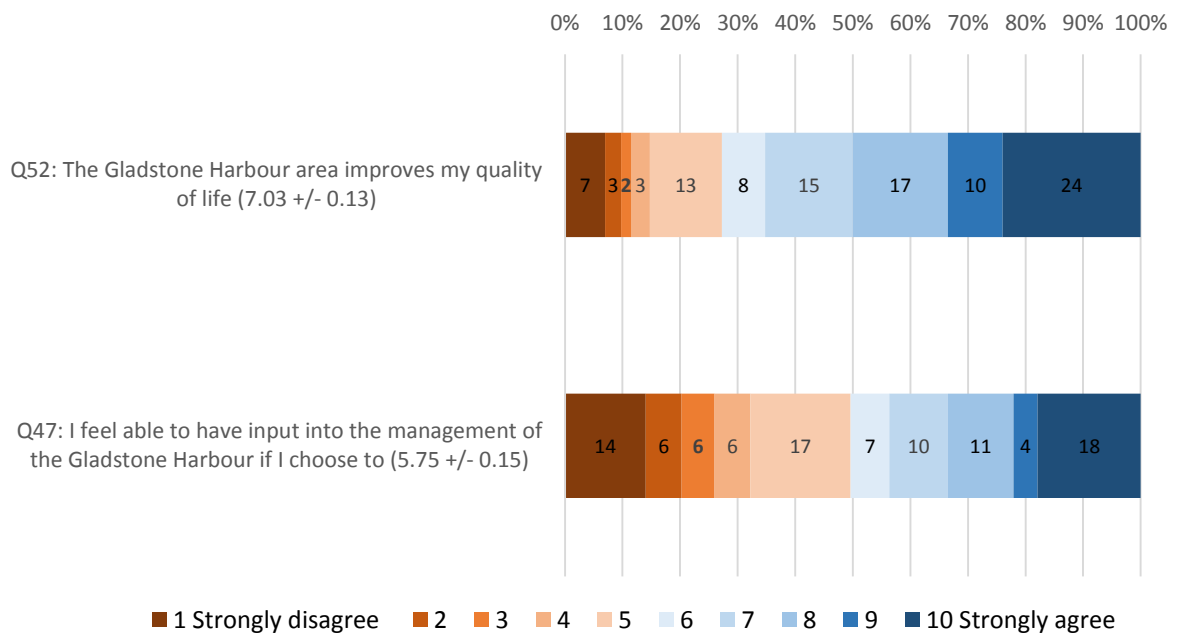


Figure C2.5: Measures of Self-efficacy

C2.5 Attitudes to Gladstone Harbour

Three CATI questions examined respondent attitudes towards the Gladstone Harbour area (questions 54, 58 and 59). As can be seen in Figure C2.6, responses to all three were strongly positive with respondents highlighting that the harbour area is a key part of the Gladstone community (mean 8.87), that it is a great asset to the local regional economy (8.96) and a great asset to the State economy (8.80).

Traditional Owners had significantly lower scores for the importance of harbour as a local asset (Q58) (mean 8.15 vs 9.05; p=0.033), but not for the other two questions (p=0.094 [Q54]; p=0.067 [Q59]).

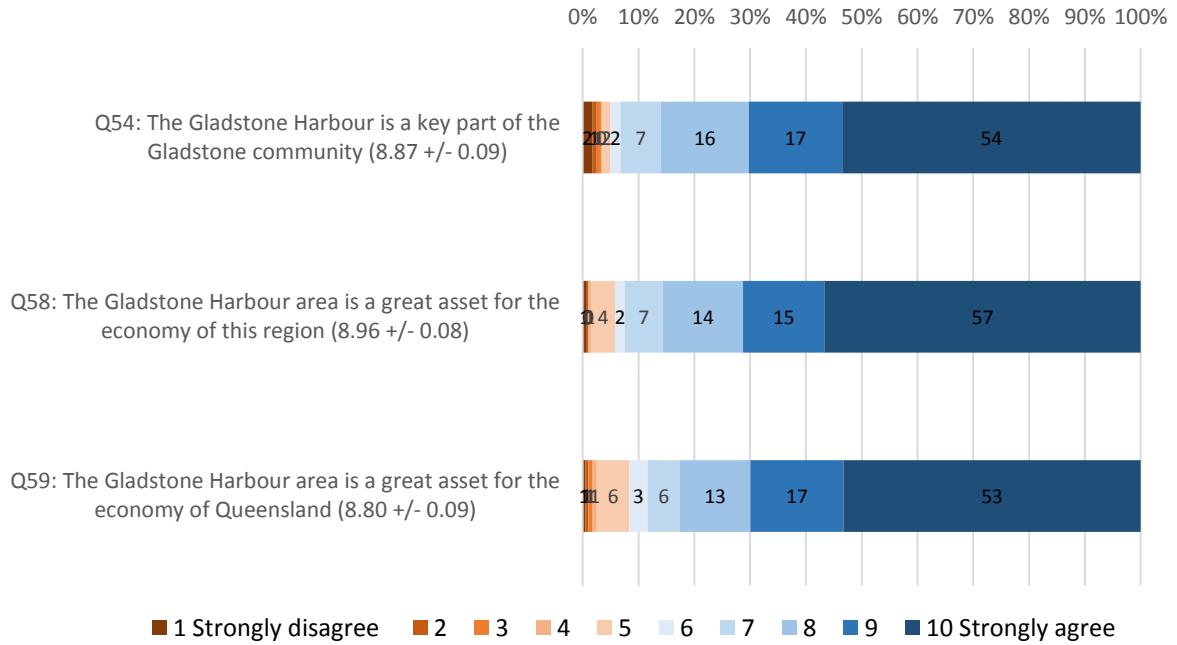


Figure C2.6: Measures of Attitudes to Gladstone Harbour

C2.6 Values of Gladstone Harbour

Respondents were asked to indicate how strongly they agree with seven statements regarding the value of different aspects of the Gladstone Harbour area, as can be seen in Figure C2.7 the first four (supports variety of marine life [mean 7.93]; opportunities for outdoor recreation [mean 8.61]; attracts visitors to the region [7.95]; scenery and sights [8.42]) were supported strongly. Respondents particularly endorsed the value of CATI question 56 ‘opportunities for outdoor recreation’ and CATI question 60 ‘scenery and sights’. Responses toward the last three questions were less positive with much lower average agreement (spiritually special places [5.11]; culturally special places [5.40] and historical significance [5.71]).

Those who identified as a Traditional Owner of the area showed significantly higher endorsement of the last three measures:

- Q61 ‘spiritually special places’ (6.61 vs 4.93, p=0.001)
- Q62 ‘culturally special places’ (6.80 vs 5.23, p=0.001)
- Q63 ‘historical significance’ (6.95 vs 5.57, p=0.006)

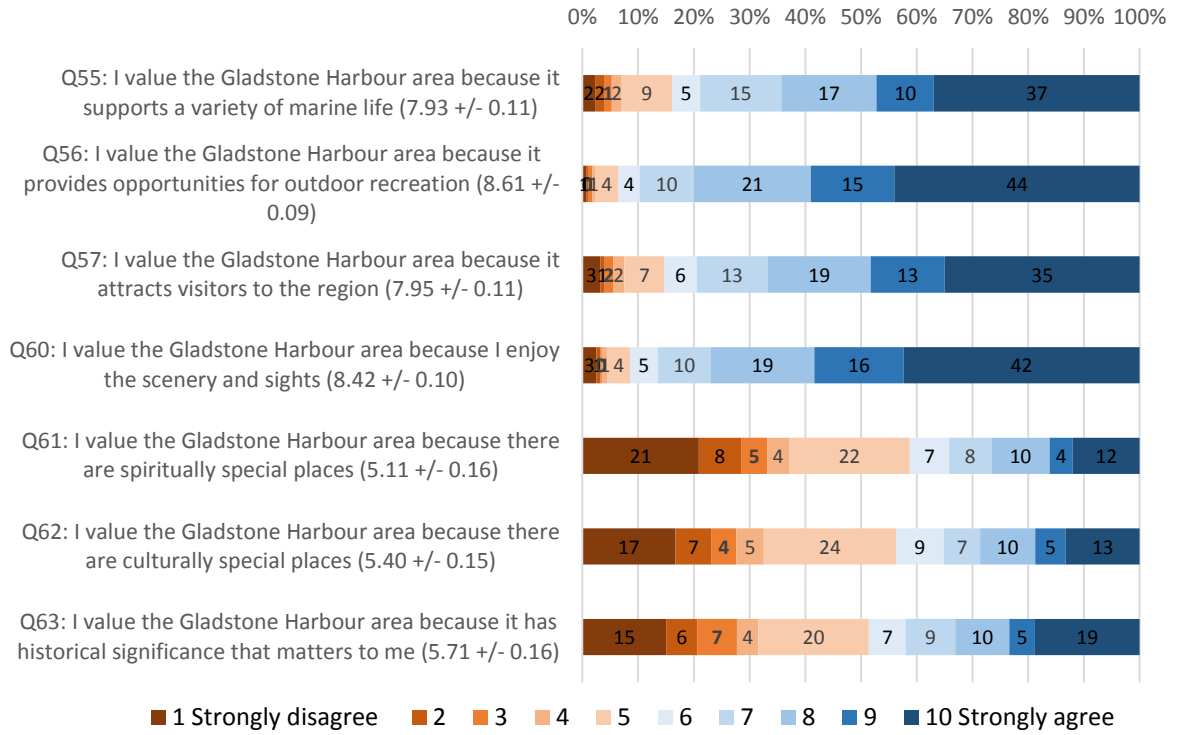


Figure C2.7: Measures of Values of Gladstone Harbour

Appendix D: Full details of recreation activity and valuation updates

A section of the CATI survey is designed to collect information about recreational activity. The results are applied to estimate the scores and grades for the 'Economic (recreational) value' indicator group. Four types of recreational activity (beach, land-based, fishing and water-based recreation) are applied as separate indicators. Updated information about recreational activity and the valuation estimates for the four recreation indicators is presented in the first two sections below. In 2018, details about fishing recreation were collected in the CATI survey to provide supplementary data and update the 2015 valuation with details and results presented in the third section below.

D1 Summary of beach, land-based and fishing recreational activity

A total of 400 responses were collected in the 2018 Gladstone CATI survey. Nearly all respondents (93%) had visited the Gladstone Harbour area in the last 12 months (a decrease of 3.5% from last year), and 343 respondents (86%) had visited the harbour for recreational purposes (a 5% decrease from last year).

The majority of respondents (68.5%) indicated that their recreational use of the harbour had not changed in the last 12 months, but more people reported increased use (19% [1% less than 2017]) than decreased use (13% [2% less than 2017]).

Just under a third of respondents (30.3%) indicated they owned a boat (35.7% in 2017) but there had been little change in use of boat ramps in the last 12 months or since the 2014 baseline.

- 2018: 162 (40%) respondents had used a boat ramp for an average of 22 times (average of 9 times for the whole sample)
- 2017: 169 (42%) respondents had used a boat ramp in the past year; an average of 19 times (average of 8 times for the whole sample)
- 2014: 156 (39%) respondents had used a boat ramp in the past year; an average of 20 times (average of 8 times for the whole sample)

Beach and land-based recreational activity were much more prevalent than recreational fishing and other water-based recreation. Ninety-three per cent of respondents had participated in beach and 88% in land-based recreation, while 41% had participated in recreational fishing and 47% in other water-based recreation. In the past 12 months there had been an increase in beach, fishing and water recreation (91%, 44% and 40% in 2017 respectively), with a decline in land recreation (92% in 2017).

Details of trip frequencies for the different activities are provided in Table D1. In 2018 there has been some change in participation frequency for certain activities. As mentioned above, participation rates have increased for beach, fishing and water recreation but declined for land-based recreation. However, participation frequency amongst users has increased in the past year for all four activities with significant (Independent Samples T-test @ 5%) increases for fishing recreation ($p=0.029$). Full sample participation frequency has also increased for all four activities, including land-based recreation despite the drop in participation rates. Full sample participation frequency had significantly increased for beach and fishing recreation ($p=0.049$ and 0.017 respectively).

Table D1: Recreational activity and frequency of participation

Response category	# trips/yr	Beach recreation		Land recreation		Recreational fishing		Water recreation	
		#	%	#	%	#	%	#	%
4-7 times a week	225	17	4.3%	22	5.5%	5	1.3%	2	0.5%
2-3 times a week	115	42	10.5%	36	9.0%	7	1.8%	7	1.8%
About once a week	60	46	11.5%	53	13.3%	11	2.8%	15	3.8%
About 1 every 2 wks	30	51	12.8%	43	10.8%	21	5.3%	23	5.8%
About once a month	13	91	22.8%	86	21.5%	41	10.3%	48	12.0%
About 4-6 times a yr	5	70	17.5%	59	14.8%	37	9.3%	41	10.3%
3 times per year	3	21	5.3%	18	4.5%	7	1.8%	18	4.5%
2 times per year	2	23	5.8%	23	5.8%	22	5.5%	18	4.5%
About once a year	1	10	2.5%	11	2.8%	13	3.3%	17	4.3%
Never	0	29	7.3%	49	12.3%	236	59.0%	211	52.8%
Total		400	100	400	100	400	100	400	100
2018 Avg trips per year (users)		39.35 (n=371)		42.97 (n=351)		24.49 (n=164)		20.01 (n=189)	
2017 Avg trips per year (users)		32.17 (n=366)		38.20 (n=368)		15.66 (n=175)		14.91 (n=161)	
2018 Avg trips per year (full sample)		36.49 (n=400)		37.71 (n=400)		10.04 (n=400)		9.45 (n=400)	
2017 Avg trips per year (full sample)		29.36 (n=401)		35.06 (n=401)		6.84 (n=401)		5.99 (n=401)	

Other general warm-up questions indicated that Tannum Sands, Boyne Island and Spinnaker Park artificial beach were the most popular beaches to visit (Figure D1.1), with little change in the last 12 months. Tannum Sands remains the most commonly visited beach.

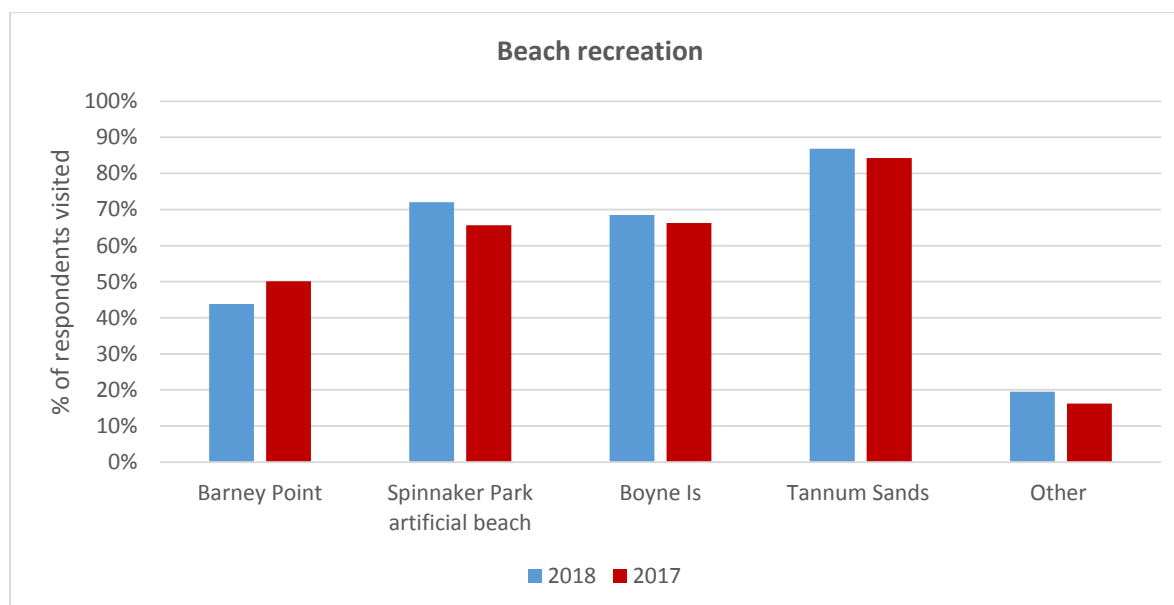


Figure D1.1: The most popular beaches visited by surveyed Gladstone residents

Walking, picnicking and relaxing were the most popular land-based recreational activities with some increase in all activities apart from cycling and participation in sporting events (Figure D1.2).

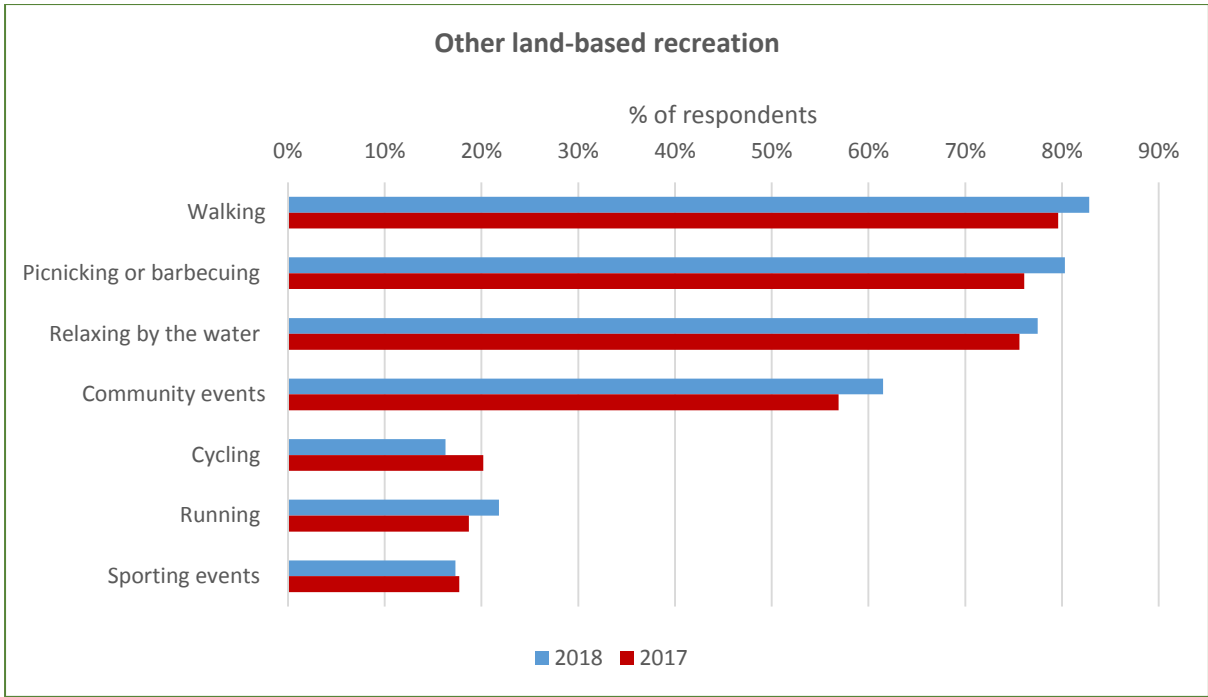


Figure D1.2: Popular land-based activities

General boating, non-motorised water sport and swimming were the most popular water-based recreational activities in 2018, with a notable increase in swimming compared to last year (Figure D1.3).

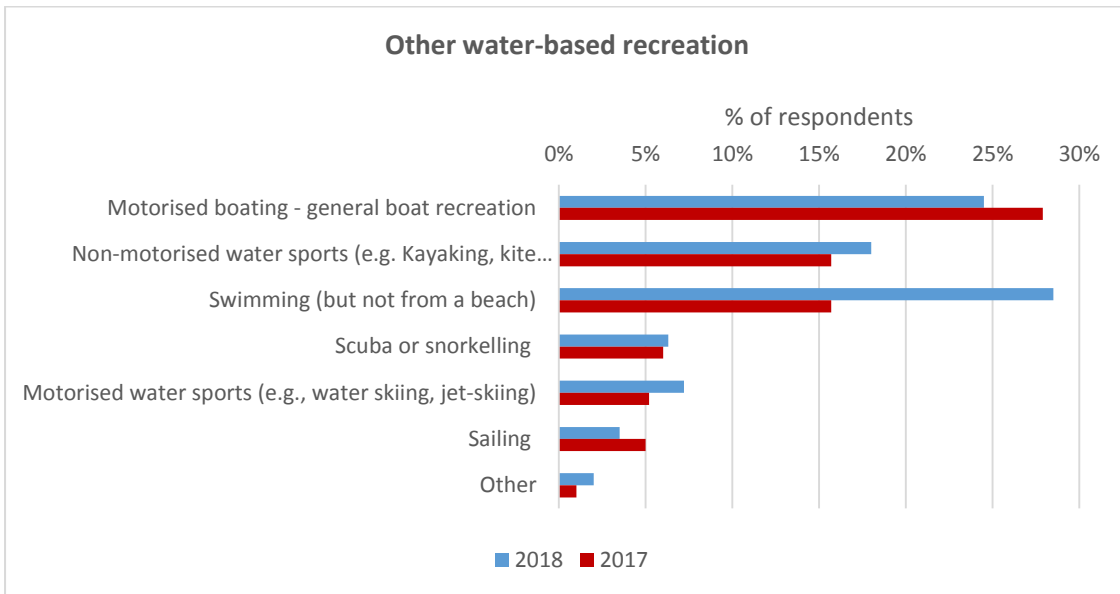


Figure D1.3: Popular water-based activities

D1.2 Satisfaction scores for beach, land-based and fishing recreation

Respondents were also asked to indicate their level of satisfaction with the four different types of recreational activity (on a scale from 1 = very unsatisfied to 10 = very satisfied). The satisfaction ratings for the activities, as well as a comparison with 2017 ratings are presented in Figure D1.4.

Overall, respondents reported high levels of satisfaction with mean scores of 8.22, 8.26, 7.36 and 8.13 for beach land-based, fishing and water-based recreation respectively. There was no statistically significant change from 2017 in mean rating scores for any of the activities.

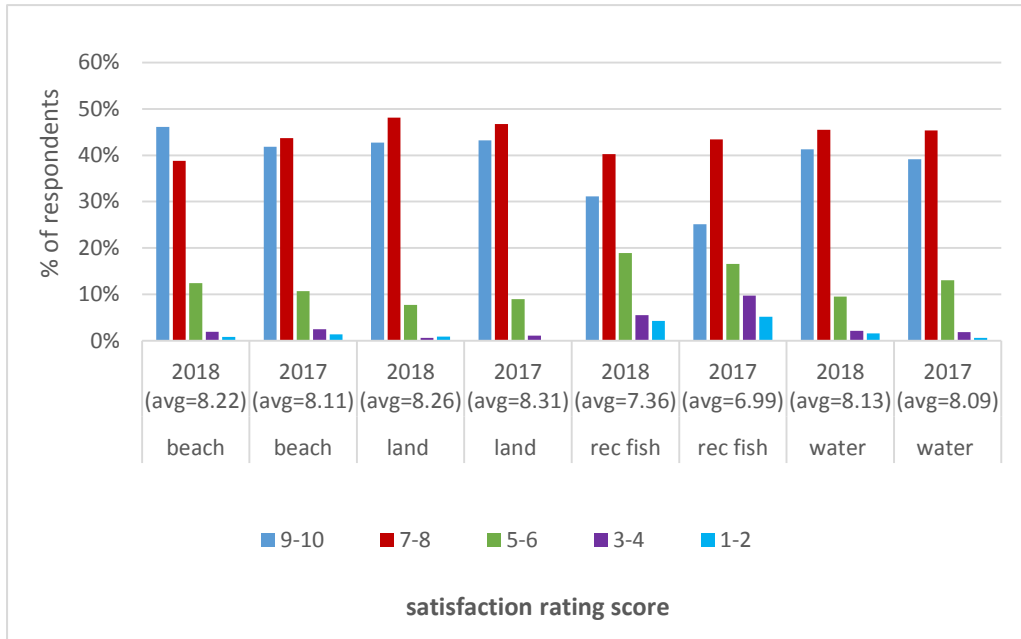


Figure D1.4: Satisfaction ratings for recreational activity

D.2 Summary of beach, land-based and fishing recreation value estimates

The value of a recreational trip for each of the four recreational activities has already been estimated and the total annual value of recreational activity was updated by adjusting activity frequency rates (collected in the 2018 CATI survey) and extrapolating the information to the Gladstone population. Details of the current trip frequency rates are provided in Table D.

To extrapolate the values from the sample to the population of Gladstone, information was applied from the Australian Bureau of Statistics (ABS). Two assumptions were made. First, to extrapolate the total trip value, it was assumed that the information provided by the survey respondent represented details of a household trip. While this may have been true for most situations, it would not have been true in all cases. It was estimated that there were 24,251 households in Gladstone, based on an average household size of 2.6 persons (ABS 2016 Census) and a population of 63,052 in 2018 (ABS Cat#3218.0). Second, to extrapolate the value of a trip per adult to the Gladstone population only adults between 18 and 80 years were given consideration. It was estimated there were 45,397 adults in this age group assuming the proportion of adults (18-80) was 72% of the population (the same as in the ABS 2016 Census). This extrapolation assumed that information on trip frequency supplied by the respondent, applied to all adults in the group, which would not have been true in all cases of recreation activity.

The results are summarised in Table D2 with increases in the annual value of all recreational activities and an overall increase in total economic value of 25% compared with the previous year.

Although the population of Gladstone had fallen slightly from 63,288⁸ to 63,052 this was overridden by the increases in participation frequency noted above.

The average annual value of recreational trips for 2018 is:

- \$34.99 million for beach recreation (\$28.21 million in 2017)
- \$51.09 million for land-based recreation (\$47.60 million in 2017)
- \$31.19 million for recreational fishing (\$21.35 million in 2017)
- \$20.23 million for water-based recreation (\$13.34 million in 2017)

Table D2: Summary of updated recreation value estimates

	Beach recreation	Land-based recreation	Recreational fishing	Water-based recreation
Household value method				
Trip value (95% confidence intervals [CIs])	\$40 ¹ (\$26 - \$105)	\$61 ¹ (\$48 - \$85)	\$143 ² (\$70-\$920)	\$95 (\$44-\$435)
Full sample: Avg # trips/yr	36.49 (2017=29.36)	37.71 (2017=35.06)	10.04 (2017=6.84)	9.45 (2017=5.99)
Annual value per trip (full sample)	\$1,467 (\$949-\$3,831)	\$2,317 (\$1,810-\$3,205)	\$1,437 (\$707-\$9,233)	\$896 (\$411-\$4,114)
Gladstone: Annual value of recreation trips	\$36 million (\$23M - \$93M)	\$56 million (\$44M - \$78M)	\$35 million (\$17M - \$224M)	\$22 million (\$10M - \$100M)
Adult value method				
Trip value/ adult (CIs)	\$21 (\$13 - \$46) ¹	\$27 (\$20 - \$42) ¹	\$61 (\$30-\$389) ²	\$41 (\$19-\$191) ³
Mean annual value per adult (full sample)	\$758 (\$474- \$1,679)	\$1,013 (\$754 - \$1,584)	\$607 (\$299 - \$3,902)	\$417 (\$191 - \$1,913)
Gladstone: Annual value of recreation trips	\$34 million (\$22M - \$76M)	\$46 million (\$34M - \$72M)	\$28 million (\$14M - \$177M)	\$19 million (\$9M - \$87M)
Average value				
2018 Gladstone: Avg Annual value of recreation trips (CIs)	\$34.99 million (\$22M - \$85M)	\$51.09 million (\$39M - \$75M)	\$31.19 million (\$16M - \$510M)	\$20.23 million (\$9M - \$93M)
% total economic value	25%	37%	23%	15%
2017 Gladstone: Avg Annual value of recreation trips (CIs) ⁴	\$28.21 million (\$18M - \$68M)	\$47.60 million (\$36M - \$70M)	\$21.35 million (\$11M - \$137M)	\$13.34 million (\$6M - \$61M)

¹ Estimate from the 2014 report card; ² Estimate from the 2015 report card; ³ Estimate from the 2017 report card

⁴ Note that the 2017 value estimates vary slightly from those presented in the 2017 report to align with the change in the source of population data for 2018.

D3 Updated valuation for fishing recreation

Data heterogeneity can make it difficult to estimate statistically significant travel cost valuation models. This is typically the case with recreational fishing data which includes the cost of boat use. Boat fuel is expensive and can comprise a very high proportion of trip related costs in the travel cost calculation. However, boat related trip costs can vary considerably amongst recreational fishers and this increases the heterogeneity in the data. Further heterogeneity is generated if both boat-based (high cost) and shore-based (low cost) fishing are included in the valuation. In the initial 2014 report

⁸ In the 2017 report the Gladstone population was estimated at 67,426 but the source has changed and population data is now sourced from the more reliable ABS Cat #3218.0.

(Pascoe et al. 2014) no model could be estimated for boat-based fishing recreation with the 51 responses, although a robust model for beach recreation was estimated with 53 responses as there was much less heterogeneity in the data.

The economic value of a recreational fishing trip (boat-based and shore-based) was initially estimated in 2015 at \$143 per trip with the 95% confidence intervals ranging from \$73 to \$4,137 (Cannard et al. 2015). The extreme range and skewed distribution (high upper limit) is indicative of the heterogeneity in the data. The estimated range in values was subsequently recalculated as \$70 to \$920 using a different procedure with 1000 draws as reported in Windle, Rolfe & Pascoe (2017). While the confidence intervals were tighter, the distribution was still skewed with some very high values.

In 2018, details about fishing recreation were collected in the CATI survey to provide supplementary data and update the 2015 valuation with details outlined below.

D.3.1 Travel cost valuation method

The same valuation methodology (Travel Cost Method) and data calculation details used previously to estimate the value of recreational activities, were repeated in 2018. Full details have been outlined in Pascoe et al. (2014) and Cannard et al. (2015) and are not repeated here. A negative binomial, count data model was applied in the valuation assuming an underlying relationship between participation frequency and travel cost, with trip frequency decreasing as cost increases. Once the travel cost of each trip is established, the total travel cost and other explanatory variables become a function of trip frequency in the travel cost model.

Some details were updated for the recreational trip cases collected previously in 2014 and 2015:

1. Transport costs for travel to the harbour were applied at a rate of \$0.765 in 2014 and 2015. This was updated to \$0.66 for the 2018 valuation based on ABS changes in car related expenses. A uniform rate of 0.66 is currently applied and was applied in the estimation of water-based recreation in the 2017 report (Windle et al. 2017).
2. The hourly wage rate to account for travel time was updated to \$36.20 per hour⁹, the same as last year as details are only updated biannually).
3. Information provided about fuel costs in 2014 and 2015 was updated to 2018 values.

As in previous years:

- The cost of travel time was included for each adult in the travel group at the rate of one third of the Queensland average hourly earnings (\$36.20 per hour in 2016).
- Multi-destination and multi-purpose trips were accounted for by estimating the proportion of the total trip time (excluding travel time) spent on the recreational activity.
- The final travel cost estimate comprised of four components: travel vehicle cost, travel time cost, boat use (fuel) costs and the proportion of time spent at the site.

$$TC_i = ((distance * vci) + (time * [12.07 * \#adults]) + boat\ cost) * Rec\%Trip$$

where TC_i is the travel cost for a travel party (travelling in the same vehicle); *distance* is the two-way distance travelled to the site; *time* is the two-way time to travel to the site; v_{Ci} is the vehicle cost per kilometre for travel method *i* (walk, bicycle=0; other vehicles = 0.66); and Rec%Trip is the proportion of the trip spent on recreation.

⁹ Australian Bureau of Statistics 2016. 6306.0 - Employee Earnings and Hours, Australia, May 2016. Australian Bureau of Statistics, Canberra.

D3.2 Recreational fishing valuation

Details of recreational fishing activity were collected in 2014 (n=51), 2015 (n=153) and 2018 (n=164). Information collected in 2014 specifically related to boat-based fishing while subsequently, details were collected about both boat-based and shore-based fishing. In both 2015 and 2018, 70% of responses related to boat-based fishing and 30% of responses related to shore-based fishing. Only details from the 2015 and 2018 CATI surveys were combined to update the valuation for recreational fishing providing a sample size of 317 responses. The distribution of travel frequency and travel cost (the two principal variables in a travel cost model) is outlined in Figure D3 below.

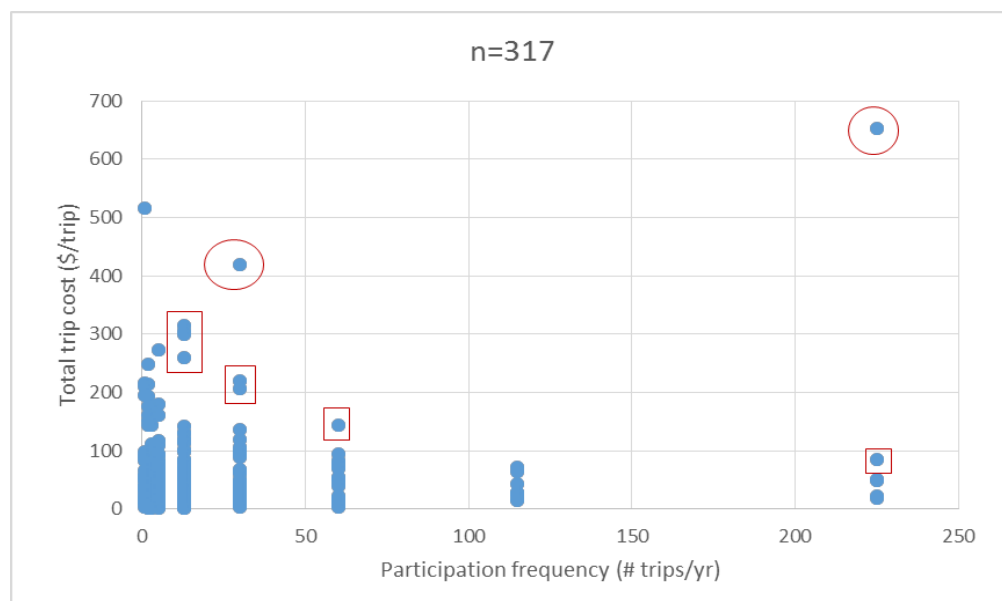


Figure D3: Relationship between participation frequency and travel cost

The treatment of outliers can have a significant impact on the final value estimates and while the process of removal can be very subjective, generally in the literature few if any details are provided about their identification or removal. After removal of the two obvious outliers (circled in Figure D3) the travel cost variable was only significant at the 10% level and the upper confidence interval was positive rather than negative. A further seven cases were removed (boxed in Figure D3) based on the premise that they reduced the trip value estimate by 5% or more, but also with an even greater associated reduction (improvement) in the upper confidence interval. The data were analysed using @LIMDEP statistical software and models were generated using @NLogit5. The final travel cost model (n=308) is presented in Table D3.

Table D3: Full sample travel cost (zero truncated negative binomial) model

Variable	Description	Coefficient	St Error
Constant		2.9559 ***	0.1907
Travel cost	Total cost of trip per group	-0.0083 ***	0.0024
Alpha	Dispersion factor	3.4286 ***	0.7668
Model statistics			
Sample size		308	
Log Likelihood		-1165	
AIC/N		7.582	
McFadden Rsrd		0.782	
Chi sqrd		8351	

*** significant at the 1% level

The model is significant (high Chi square value) and reasonably strong (McFadden R square >0.78). The *Alpha* value is highly significant indicating there was significant over-dispersion, supporting the application of negative binomial model. As expected, travel costs were a significantly negative influence on trip frequency (the dependent variable).

The mean economic value (consumer surplus) of a recreational fishing trip was estimated at **\$120.76 per trip** ($-1/\beta_{\text{travel cost}}$), with the 95% confidence intervals (**\$75.57 to \$270.30**) calculated from 1000 draws using the Krinsky and Robb (1986)¹⁰ procedure. On average there were **2.341 adults** per group trip which provides an economic value of **\$51.59 per adult/trip**.

The final sample (n=308) comprised 212 cases (69%) which involved a boat and 96 cases (31%) without a boat (shore-based fishing).

Further exploratory analysis of the data revealed that none of the socio-demographic variables (age, gender, income or length of residency) or trip time were significant influences on the dependent variable, trip frequency. However, respondents with higher satisfaction ratings (7/10 or above) were significantly associated (at the 5% level) with higher trip frequency.

Further data analysis revealed the following and highlight the caution required about wider interpretations of recreational fishing trip values.

1. The estimated value of a recreational fishing trip (\$120.76) applies to both boat and shore-based fishing and is not representative of either one. This is an important distinction that needs to be noted in publications. It also implies that any data supplements should comprise of boat-based and shore-based cases (approx. 70:30).
 - a. The value of boat only trips (n=212 [removing the same cases as above]) was estimated at \$92.66 (\$64.37 - \$165.32)
 - b. The value of shore based fishing (n=92) was estimated at \$37.54 (\$21.77 - \$136.07). The four cases removed were different from above where all removals related to boat trips.
 - c. Boat-based fishing represents 71% of the combined value of boat and shore-based recreation, reflecting the overall level of participation.
 - d. If the 51 cases from the 2014 data are included (47 of which related to boat-based fishing), the trip value increases from \$120.76 to \$131.69 (\$83.47 to \$311.76) (n=354)
2. Pascoe et al. 2014 recommended recreational trip values be recalculated every five years to account for temporal changes in trip values. The intention of collecting recreational fishing data in 2018 was to supplement the 2015 sample. Applying the 2018 data to calculate a new value would have produced a very different answer with important implications.
 - a. The value of fishing recreation from 2018 data (n=159) was estimated at \$88.23/trip (\$53.97 - \$241.59) with the same five cases removed as outlined above. The lower trip value estimate (compared with 2015) was associated with increased trip frequency rates (24.49 trips/yr in 2018 compared with 17.44 in 2015).

Recommendations

It is recommended that the value of a recreational fishing trip currently applied in report card analysis (\$143) be updated to \$120.76. It should be noted that the change in valuation does not imply an underlying change in value, just that the improved sample size provides a more robust value estimate.

¹⁰ Krinsky, I. & Robb, A. 1986. On approximating the statistical properties of elasticities. *Review of Economics and Statistics* 68, 715–719.

Two key lessons:

1. There is considerable heterogeneity in the recreational fishing data, both within the boat-based activity and across boat and shore-based activity. Updating previous data with supplementary information provides a more robust valuation model and consideration should be given to this option in future rather than estimating a new updated value with data from a single year which may be subject to temporal variation.
2. Values for boat-based and shore-based fishing vary substantially. Current data should not be supplemented with data relating to only one activity. Similarly, it not advisable to transfer the value for the combined activity to estimate values for either of the separate activities in a benefit transfer.