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Final Report on the Status of the Social, Cultural (Sense of place) and Economic Components for the Gladstone Harbour 2017 Report Card

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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. 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 et al. 2017).

The Gladstone Harbour Report Card is produced annually and 2017 is the fourth 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 five levels of assessment. In this report, the results (scores and grades) are presented for the Social, Cultural ('Sense of place') and Economic components (2nd level) along with their constituent indicator groups (3rd level), indicators (4th level) and measures (5th level). 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 400 respondents (n=401 in 2017) and 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 to produce 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. The transition revealed some anomalies in the 2015 data analysis which were identified in the report (Windle et al. 2016). These issues have mainly been resolved and this year the automated data analysis proceeded smoothly. All modifications have been documented in the methods section, but they were only relatively minor including:

- A uniform 10-year moving average was applied for all secondary data sets, affecting Shipping and Commercial fishing in the Economic performance group.
- Expenditure from cruise ships (passengers and crew) was included in Tourism expenditure for the first time.
- A correction was made to an error in the R-script for the 'Satisfaction with harbour recreational activities' indicator in the Harbour usability social indicator group.
- Mobile phone contacts were used for the first time as a recruitment tool, in addition to the standard use of landlines, for CATI survey respondents.

Primary data collection

This year, for the first time, it was possible to access geographically specific mobile phone numbers to recruit respondents for the community survey. In the 2017 CATI (computer assisted telephone interview) survey, 232 respondents (57.9%) were contacted via mobile phones and 169 (42.1%) via landlines. There was no significant difference (Pearson's Chi Square crosstabs at 5%) in the gender, education or income profiles of the two samples, but there was a significant difference (at the 1% level) in the age profiles. As expected, the mobile coverage recruited more young people and the age profile of the total sample has improved compared to last year. For the first time since the survey was piloted in 2014, the proportion of respondents in all the age categories over 34 years matched the population. However, recruiting respondents in the youngest age group (18-24 years) remains difficult and the sample proportion is well below the population.

A parallel online survey was also conducted in 2017 to explore its efficacy as an alternative data collection method. The results were not included in the analysis for the report card. Details of the online survey are presented in Appendix E. The results indicate that there was little difference in the responses from the online survey compared with the CATI survey, substantiating the viability of the collection method. However, the age profile of the sample was problematic with too many older respondents. This was symptomatic of the recruitment process (respondents were sourced via the CATI survey with inherent age bias) rather than the collection method. There is potential to apply the methodology in future if a more robust recruitment method is developed such as collecting email addresses of willing participants throughout the year from a range of potential sources and building an internet panel for the survey in coming years (Recommendation 7).

Sensitivity testing

Some sensitivity testing has occurred in the past but reporting has not been consistent. In the initial pilot report testing was conducted to determine the sensitivity of an outcome to changes in each measure (Pascoe et al. 2014: Section 3.8.3). Many measures showed little sensitivity but some were more important in their cumulative impact on the indicators and others were not expected to change substantially on an annual basis. There was no recommendation to remove any measures from the report card assessment.

In 2016, some sensitivity factors were tested to determine their relative influence on the CATI survey responses for the social and cultural indicators. The results were reported in Appendix C in the 2016 report but not in a summarised format. In 2017 more systematic testing of sensitivity factors was conducted. The results are outlined in Appendix C and summarised in Section 4.

In the Social component, gender (with no associated sampling bias) was the most frequent differentiating factor and the 'Perceptions of air and water quality' indicator attracted the most differences. In the Cultural 'Sense of place' component, identifying as a Traditional Owner (with some associated sampling bias) was the most frequent differentiating factor, followed by gender. The 'Values of Gladstone Harbour' indicator attracted the most differences.

Age had some impact on results but it was not a prevalent factor, which partially alleviates concerns about sample bias in the under 35 year age cohort.

New valuation for other (non-fishing) water-based recreation

In the 2017 CATI survey, travel details were collected for a fourth type of recreational activity in the harbour area; other water-based recreation. This classification had been included in the 2014 assessment and 54% of respondents had indicated they participated in this type of activity. However, there had been insufficient responses to generate a separate travel cost model and

provide a valuation estimate. In the 2017 survey, 161 (40%) respondents provided detailed information about other (non-fishing) water-based recreation in the harbour area and a travel cost model was generated (full details are provided in Appendix D).

- The annual economic value of other water-based recreation was estimated at $14.70 million representing 12% of the total annual household recreation value of $127 million; comprising:
    - Beach recreation: $31 million
    - Other land-based recreation: $56 million
    - Recreational fishing: $25 million
    - Other water-based recreation: $15 million

This is an important additional indicator of recreational value that could be included in the Economic indicator group (Recommendation 4).

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 Beautiful, Fishing and Industrial. Other words associated with recreational activity were also prevalent.

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.

The beauty and aesthetic value of the harbour is not assessed as a separate measure for any of the indicators in the report card, although the benefit it provides would be captured to some extent in the value of recreation which is assessed in the Economic component. A recommendation is made to include Aesthetic value as a new social indicator (Recommendation 3).

Social

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

There has been relatively little change in the scores for two of the three indicator groups (Table E1) but notable changes have occurred in Harbour usability.

The four point decline in the overall score for the Harbour usability indicator group is a result of significant and somewhat offsetting changes in two of the indicators. Corrections in data analysis now mean that the score for 'Satisfaction with harbour recreational activities' is higher than last year and better represents community attitudes to recreation in the harbour area which are generally positive. In the 'Perceptions of harbour safety for human usage' indicator, there has been a significant increase in the incident rate for marine safety incidents and oil spills. This is a real increase, but the reporting area for both measures is the Gladstone maritime region (as standard methodology) and not all incidents occur in the Gladstone Harbour area. There is a recommendation to remove these from this indicator as inappropriate measures of social perceptions. (Recommendation 1).

The Harbour Access and 'Liveability and wellbeing' indicator groups have seen relatively little change in the past 12 months with a one point improvement and no change respectively. All but two of the associated measures recorded a one point change (both increases and decreases). Scores for Harbour access have shown a small but steady improvement over the four year reporting period, but less change is apparent for 'Liveability and wellbeing'.

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

	Social component: 2017 = 0.66 (B) 2016 = 0.66 (B); 2014 = 0.58 (C)						
Indicator Group	**Score/ Grade**			**Indicators**	**Score/ Grade**		
	2017	2016	2014		**2017**	2016	2014
Harbour usability	**0.62 C**	0.66	0.60	Satisfaction with harbour recreational activities	0.69	0.67	0.70
				Perceptions of air and water quality	0.56	0.55	0.46
				Perceptions of harbour safety for human use	0.60	0.76	0.38
Harbour access	**0.66 B**	0.65	0.61	Satisfaction with access to the harbour	0.72	0.69	0.67
				Satisfaction with boat ramps + public spaces	0.65	0.64	0.60
				Perceptions of harbour health	0.63	0.62	0.53
				Perceptions of barriers to access	0.65	0.65	0.64
Liveability wellbeing	**0.66 B**	0.66	0.64	Liveability and wellbeing	0.66	0.66	0.64

Cultural ('Sense of place')

The overall grade for the Cultural ('Sense of place') component is a B Grade (score of 0.65) with little change from previous years (score of 0.66 in 2016 and 0.64 in 2014).

The one indicator group ('Sense of place') assessed in this project comprises six indicators and 17 measures. Since 2016, there has been no change in the scores for three of the indicators and only slight changes in the scores for the other three (Table E2). In general the improvements since the 2014 baseline have been maintained. The largest change was a 5 point decline in the score for the Continuity indicator, which is related to improvements in the age profile of the CATI survey sample and improved representation by respondents in the younger age groups. The high score for the Attitudes indicator highlights the importance of the harbour to the community.

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

Cultural component: 2017							
Indicator Group	**Score/ Grade**			**Indicators**	**Score/ Grade**		
	2017	2016	2014		**2017**	2016	2014
Sense of place	**0.65 B**	0.66 B	0.64 C	Distinctiveness	**0.57**	0.59	0.55
				Continuity	**0.54**	0.59	0.57
				Self-esteem	**0.72**	0.74	0.69
				Self-efficacy	**0.58**	0.58	0.55
				Attitudes to harbour	**0.81**	0.81	0.80
				Values of harbour	**0.66**	0.66	0.64

Economic

The overall grade for the Economic component is a B (score of 0.74) which is a slight decline from 0.75 in 2016 and 2014. While there is little change in the overall score, there have been both positive and negative changes in the economic health of the harbour in the last 12 months (Table E3).

The Economic performance indicator group continues to improve, with increases in Shipping activity and Tourism expenditure, but a decline in Commercial fishing.

- Shipping: generated **$479 million** in total income to the Gladstone Ports Corporation in 2015-16, up from $453M in 2014-15.
    - Associated with increases in LNG exports
- Tourism expenditure was worth **$317 million** (2015-16), up from $275M in 2014-15.
    - General increase plus additional value from cruise ships
- Commercial fisheries in the Gladstone region (grid area S30) was worth **$1.93 million** (2016-17) down from $2.83M in 2015-16, but catch data for the last three months of the financial year have not yet been recorded.
    - Declines in Net (fish) and Trawl (prawns) production are most relevant accounting for 35% and 44% of production (catch) respectively.

The Economic stimulus indicator group continues to decline with an increasing rate of unemployment and a decline in the socio-economic status, with statistically significant (at the 1% level) declines in mean household income and the number of adults over 18 years in the household.

The economic value of recreation retains its importance with no change of note in the last 12 months. The estimated value of recreation **$104 million** is a third of the estimated expenditure for Tourism.

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

Economic component: 2017 = 0.74 (B) 2016 = 0.75; 2014: 0.75							
Indicator Group	**Score/ Grade**			**Indicators**	**Score/ Grade**		
	2017	2016	2014		**2017**	2016	2014
Economic performance	**0.90**	0.87	0.83	Shipping activity	**0.90**	0.87	0.83
				Tourism	**0.90**	0.72	0.60
				Commercial fishing	**0.35**	0.43	0.66
Economic stimulus	**0.67**	0.74	0.87	Employment	**0.53**	0.62	0.72
				Socio-economic status	**0.70**	0.80	0.90
Economic (recreation) value	**0.73**	0.73	0.75	Land-based recreation	**0.76**	0.76	0.76
				Recreational fishing	**0.65**	0.66	0.67
				Beach recreation	**0.74**	0.75	0.71

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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 2017 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 et al. 2017).

The Gladstone Harbour Report Card is produced annually and 2017 is the fourth 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	**Cultural**	**Economic**
• Harbour usability • Harbour access • Liveability and wellbeing	• Sense of Place	• Economic performance • Economic stimulus • Economic value (recreation)
With 8 indicators	With 6 indicators	With 8 indicators
And 22 measures	And 17 measures	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. Some small modifications were made for the 2015 report card (Cannard et al. 2015) and 2016 report card (Windle et al. 2016). In most cases these 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 2017 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 a few minor adjustments (documented in the methodology section), there are no changes to the data sources or methodology compared to those applied last year in the 2016 report card (Windle et al. 2016).

In 2017 there were two additional components to the project compared with previous years. Both were designed to scope the potential for changes in the future and do not influence the results for the 2017 report card. The first was to estimate an economic value for other (non-fishing) water–based recreation. The necessary details were collected in the 2017 community survey and a value estimate was generated. The results are presented in Appendix D.

The second addition was to run a parallel online survey. Every year, at the end of the standard CATI survey respondents were asked if they would be willing to be contacted again to complete the survey in the future. Willing respondents were sent an email invite to complete the 2017 survey online (594 contacts). Full details are provided in Appendix E.

In June 2017, the Australian Bureau of Statistics released information collected in the 2016 Census and demographic details in the community profiles became available and have been applied in the socio-demographic analysis. However, detailed information to update the Index of Economic Resources (Economic stimulus indicator) is not released until 2018.

1.2 Aims and objectives

The aim of this project is to collect details and provide information for the Gladstone Harbour 2017 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 (Pascoe et al. 2014) and 2015 (Cannard et al. 2015) report cards 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 (2015-2016) 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). More detailed information including the partners who comprise the GHHP can be found at www.ghhp.org.au. The GHHP along with its research 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. The system exactly matches that of the Australian education system and was the first environmental report card to do so. 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 t6he 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 secondary data sources) outlined in the 2015 (Cannard et al. 2015) and 2016 (Windle et al. 2016) reports. Data have been collected from both primary (community questionnaire survey) and secondary sources. In 2017, the same data sources described in the 2016 report were applied with only minor modifications for the three indicators of Economic performance. A standardised 10-year data array was applied for the Shipping activity and Commercial fishing indicators (with some variation in the 2015 and 2016 reporting years). In 2016 cruise ships started docking at Gladstone and this year spending from cruise ships (passengers and crew) was included in the assessment for the Tourism indicator.

In addition, an error was corrected in the R-script for the 'Satisfaction with harbour recreational activities' indicator in the Harbour usability social indicator group[1].

Detailed explanations of the methods applied to calculate the report card scores and grades have been provided for the 2014 (Pascoe et al. 2014) and 2015 (Cannard et al. 2015) report cards. In 2017, the same methods are repeated and only a summary overview is 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 2017 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 measure' 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

[1] Details are provided in Recommendation 1 in the 2016 report.

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 and/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, 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	*Marine incidents in Queensland 2016.* Department of Transport & Main Roads, Maritime Safety Queensland, *Annual Report*	Data 2007-2016 (calendar year). Rate of incidents in Gladstone maritime region compared to other Qld regions
		Oil spills	Queensland Dept. Transport and Main Roads, *Maine Pollution Data 2002-2017*	Data 2007-2016 (calendar year). Rate of incidents in Gladstone maritime region compared to other Qld regions
		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)	10 point scale
	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

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 the 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 (2016-17 financial year)	Gladstone Ports Corporation (GPC)	Time series data from 2007-08 to 2016-2017
	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 2006-07 to 2012-13 financial years) Expenditure on hotel accommodation and food (2013-14 financial year to present). Gladstone Regional Council Economic Profile – REMPLAN 2016: AEC (2016). Economic Impact Assessment of the Cruise industry in Australia, 2015-16. Report for the Australian Cruise Association.	10-year average 2006-07 to 2015-16
	Commercial fishing	Productivity of line fisheries	**Production (fishing effort)** Queensland Fishing (QFish), Queensland Department of Agriculture and Fisheries **Prices (fish, prawns crabs)** ABARES – Australian fisheries and aquaculture statistics 2015 (published Dec 2016)	10-year average (time series data from 2007-08 to 2016-17*
		Productivity of net fisheries		
		Productivity of trawl (otter) fisheries		
		Productivity of pot fisheries		
Economic stimulus	Employment	Gladstone LGA unemployment data (2017 March quarter)	Queensland Government Statistician's Office, sourced from the Australian Department of Employment, *Small Area Labour Markets*	Queensland 2017 distribution (March quarter)
	Socio-economic status	Index of economic resources derived from 2011 ABS census and updated using the community CATI survey	CATI survey; Australian Bureau of Statistics, 2011 census	Australian 2011 distribution
Economic value (Recreation)	Land-based recreation	Land-based recreation satisfaction + economic value	Satisfaction: CATI survey + economic value (Pascoe et al. 2014)	10 point scale
	Recreational fishing	Recreational fishing satisfaction + economic value	Satisfaction: CATI survey + economic value (Cannard et al. 2015)	10 point scale
	Beach recreation	Beach recreation satisfaction + economic value	Satisfaction: CATI survey + economic value (Pascoe et al. 2014)	10 point scale

* At the time of reporting three months production data for April to June 2017 were still unavailable as outlined in Section 2.4 below.

Table 4: Details of 2017 modifications to data analysis

Action	Rationale	Impact
Economic performance:		
Uniform 10-year moving average applied to all secondary data sets. • Shipping: 20 yr in 2016 • Commercial fishing: 12 yr in 2016	Recommendation 6 from 2016 report. Agreement from ISP March 2017	**Shipping**: Low. Testing indicated little impact **Fishing:** Some due to annual variation in data
Tourism (Economic Performance)**:** Estimated value of expenditure from cruise ships included in total for 2017	Cruise ships started docking at Gladstone in 2016	**Tourism:** Low. Expenditure (passenger and crew) 0.1% of total expenditure.
Harbour usability:		
Indicator 'Satisfaction with harbour recreational activities'		
Measure 'How satisfied with last trip'	Correction to error in R-script[1]	Score should increase: no change in result from 2016
Measure 'Quality of ramps and facilities'	Correction to error in R-script[1]	Score should increase slightly + small increase in result from 2016

[1] Details are provided in Recommendation 1 in the 2016 report.

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 to produce 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 unwieldly 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 2017, the CATI survey was conducted with residents in the last two weeks of May and 401 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 some economic indicators such as recreation activity values and socio-economic status (see Table 3).

The aggregation weightings for the social and cultural ('Sense of place') indicators and measures were derived from the Technical experts' survey. Aggregation weighting for the indicators groups were derived from the Management experts, Technical experts and Community surveys (Pascoe et al. 2014).

2.4 Secondary data sources (economic indicators)

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 and summarised in Table 3.

The aggregation weightings for the economic indicators/measures are based on their economic impact. Aggregation weighting for the indicators groups were derived from the Management experts, Technical experts and Community surveys (Pascoe et al. 2014).

2.4.1 Economic performance

The Economic performance indicator group consists of three indicators, Shipping activity, Tourism (expenditure) 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. A 10 year data array is analysed (amended from a 20 year array in 2016) and this year it was updated with information from the 2016-2017 financial year. 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 full 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 2015-16 financial year.

In March 2016, the first cruise ship visited Gladstone and in 2015–16 four cruise ships docked at Gladstone Port. Information about tourism expenditure from these cruise ships (passengers and crew) has been sourced from an AEC consultancy report[2] 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 four fisheries sectors: the line (fish), net (fish), otter trawl (prawn) and pot (mud crab) sectors, with each assessed as a separate measure for the indicator. A standard 10-year data array is analysed (12 year array in 2016), with production data updated for 2016-17. Additional information about the average price for fish, prawns and crabs is derived from ABARES fisheries statistics, with updated information for 2015 sourced from Savage (2016: p 112, 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 025) 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 four different fisheries/measures are weighted by their relative contribution to the gross value of production (GVP).

Commercial fishing: missing values and sensitivity testing

The QFish database (annual catch and effort data for the 10-year array, across the three regions) contains a relatively high proportion of missing values, principally related to line fisheries. In the data analysis, all the missing values in the dataset are converted to '0'. This conversion is done so that all production years in the dataset (including the ones with missing values) are included in the analysis. In the 2016 report there was some concern (Recommendation 4) that converting values in this way may introduce bias as missing values are different from zeros. This year, sensitivity testing was conducted to determine the impact on the report card score of treating missing values (mvs) under different scenarios.

[2] AEC (2016). Economic Impact Assessment of the Cruise industry in Australia, 2015-16. Report for the Australian Cruise Association (Table E2).

1. Mvs are replaced with zeros as in previous years.
2. Mvs are replaced with the mean value for the data array
3. Line fishing is deleted completely (note that it only comprises 1-2% of the total production, even when mvs are replaced with means
4. Mvs are retained

There are 30 cases for each of the four fishing sectors in the 10-year dataset (three regions per year). Over the current 10-year array (2007-08 to 2016-17), there are 17 missing values (56.7% for Line fishing; one (3.3%) for Net fishing and none for Trawl or Pot fisheries. The results of the sensitivity testing are outlined in Table 5 below.

Table 5: Treatment results for missing values in the Commercial fishing dataset

10 year data	**Indicator**		**Measures**		
2008-17	Commercial fishing	Line	Net	Trawl	Pot
2016 report card scores	**0.43**	**0.27**	**0.34**	**0.38**	**0.65**
2017 report card scores					
% missing values		***57%***	***3%***	***0%***	***0%***
1. Replaced by zeros (same 2016)	**0.349**	**0.9**	**0.298**	**0.254**	**0.623**
2. Replaced by mean	0.352	0.9	0.298	0.254	0.623
3. Line Removed	0.347		0.298	0.254	0.623
4. Mvs retained	0.499	0.9	0.331	0.451	0.857

In 2017, there is a reduction in the overall score for commercial fishing (compared with 2016) due to a reduction in production for Net and Trawl fishing as outlined in the results section of the report. Net fishing experiences a decline in two out of three reporting regions and a missing value for the third. There is also a production increase for Line fisheries. The results indicate that replacing the missing values with zero or replacing them with the mean value makes little difference to the score. Removing Line fishing completely also makes little difference to the indicator score as the sector represents a small proportion (1-2%) of total production. A recommendation is made to remove Line fishing as a measure for the Commercial fishing indicator. Retaining the missing values has the most impact and is not recommended. However, no change has been made to the methodology in this reporting year.

There is another issue of missing values in the QFish datasets. Information from the annual dataset is applied for analysis. However, the latest dataset accessed for this report is still missing data for the last three months (April–June) of the 2016-17 financial year. It is not clear how much data was missing last year for comparative purposes. The database is constantly being updated. Last year, the dataset was accessed several times over a period of four months and each time the data had changed and was updated. The final dataset that was submitted to the DIMS team last year was accessed in September, but the production figures are still lower than the dataset for the 2015-16 financial year that is currently available.

It would be useful to delay the submission of this report for as long as possible to maximise the benefits of an updated database. The constant updating also implies that it would be useful to update the previous year's data for the 10-year array applied each year in the analysis.

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 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 2017 quarter. Unemployment in the Gladstone LGA is compared with unemployment rates in all Queensland Local Government Areas.

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. The IER was formally calculated by the ABS using 2011 census data and a system of weightings for the different variables (Pink 2013). The index focuses on variables such as income, housing expenditure and ownership, cost of living and assets of households. The index is adjusted for the Gladstone region, and updated annually, by applying information collected in the CATI survey. The ABS loadings are applied and these are currently still based on the 2011 census data as updated 2016 census data is not yet available.

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

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. This was noted in 2016.

2.5 Valuation of recreational activity

One of the three economic indicator groups to be assessed in the GHHP report card is the Economic value of 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. The second type of recreation values are classified as non-market values. These are values associated with local and regional 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 these as non-market values 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).

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). Based on recommendations in the 2014 pilot report card (Pascoe et al. 2014), the recreational trip values only require updating every five years.

Two factors are included in the calculation of the report card score for each of the three 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 three types of activity are also collected in the CATI survey.

The scores for the three 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).
- **Marine safety incidents and oil spills data:** relates to the Gladstone maritime region which includes 1868 km of mainland coastline from Double Island Point to St. Lawrence, 1342 km of island coastline and 26,190 km of inland waterways[3]. This region incorporates the Port of Gladstone, Port Alma, Port of Bundaberg and marinas in Hervey Bay, Bundaberg and Rosslyn Bay.
- **CATI survey**: the community survey is only administered to residents within the Gladstone Postal area (4680). A map to illustrate the geographical area covered by the survey is provided in Figure 2.

[3] Qld Dept. Transport and Main Roads (2013) Queensland's Maritime Regions, December 2013

Source: Map courtesy of Peter Smith, Fitzroy Basin Association as presented in Cannard et al. (2015).

Figure 2: Gladstone Local Government area and Gladstone postal area

3. Results

The results for this project are presented in the following subsections. Initially, a demographic overview of the CATI survey respondents is provided before displaying the outcomes of the word cloud analysis. The following section includes a summary of the recreational activity results as well as an update of the recreational value estimates for 2017. 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 401 responses were collected in late May for the 2017 CATI survey. In previous years recruitment has only been made through landlines and there has always been some concern that this biased the survey sample as many people, particularly younger people, have moved away from landlines and rely completely on the use of mobile phones. This year, for the first time, it was possible to access geographically specific mobile phone numbers. In the 2017 CATI survey, 232 respondents (57.9%) were contacted via mobile phones and 169 (42.1%) via landlines. There was no significant (Pearson's Chi Square crosstabs at 5%) difference in the gender, education or income profiles of the two samples, but there was a significant difference (at the 1% level) in the age

profiles. As expected, the mobile coverage recruited more young people and the age profile of the total sample has improved compared to last year with more people in the younger age groups and less in the older age groups (Figure 3). However, recruiting respondents in the youngest age group (18-24 years) remains difficult and the sample proportion is well below the population (Table 6).

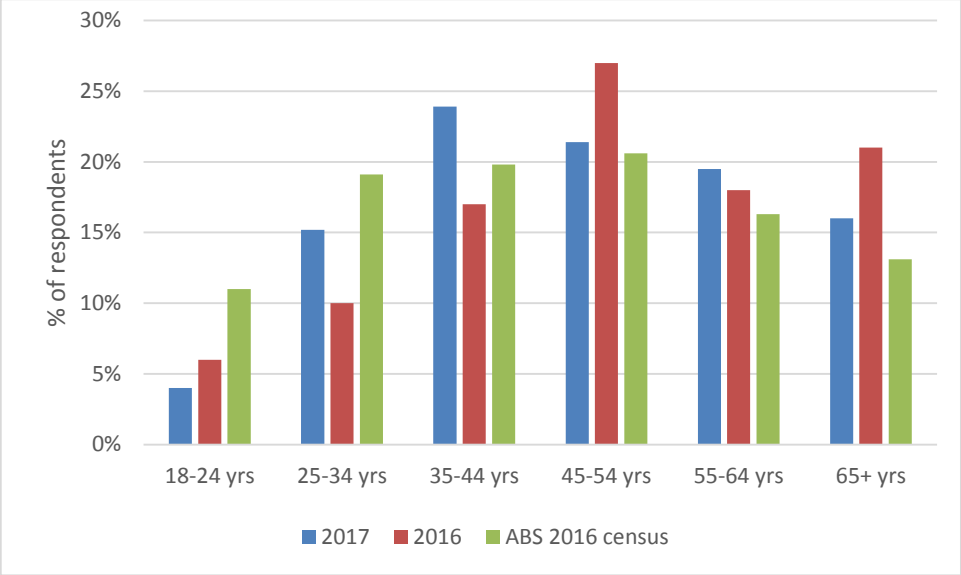


Figure 3: Age profile of respondents compared to the 2016 survey and 2016 Census data

For the first time since the since the survey was piloted in 2014, the proportion of respondents in all the age categories above over 34 years matched the population (Table 6). Gender was a segmentation criteria in the survey and controlled to ensure equal representation. In previous years, the household income distribution of the sample was well aligned with the population, but this was not the case in 2017. However, there is a match with the population if the two lowest and two highest income categories (Table 6) are combined. Eight per cent of the sample do not provide information about their income.

In 2017 information was collected for the first time about educational qualifications but comparable data from the 2016 census is not available from the Australian Bureau of statistics (ABS) until October 2017. Compared with 2011 census data, the proportion of respondents with a post-school qualification (52.6%) matches the population but the proportion with a tertiary education (24.9%) is much higher, which commonly occurs in questionnaire surveys.

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

% respondents	**CATI survey 2017**	ABS Census (2016)	**2017 Landline**	**2017 mobile**	survey 2016	survey 2014
Gender						
% male	**50%**	51%	52.7	48.3%	50.4%	51%
Age category						
18-24 yrs	**4.0%***	11.0%	2.4%	5.2%	6%*	3%*
25-34 yrs	**15.2%***	19.1%	8.3%	20.3%	10%*	7%*
35-44 yrs	**23.9%**	19.8%	22.5%	25.0%	17%	20%
45-54 yrs	**21.4%**	20.6%	16.6%	25.0%	27%*	25%*
55-64 yrs	**19.5%**	16.3%	22.5%	17.2%	18%*	21%*
65+ yrs	**16.0%**	13.1%	27.8%	7.3%	21%	24%*
Annual household income						
Less than $20,799	**11.4%***	4.4%	13.2%	10.1%	11%	12%*
$20,800 – $41,599	**11.4%***	15.3%	15.1%	8.8%	13%	13%
$41,600 – $64,999	**9.2%***	12.9%	9.9%	8.8%	11%	10%
$65,000 – $77,999	**6.2%**	7.3%	7.9%	5.1%	7%	5%
$78,000 – $103,999	**15.7%**	12.2%	13.8%	17.1%	15%	18%
$104,000 – $129,999					13%	12%
$130,000 – $155,999					11%*	11%*
$104,000 – $155,999[1]	**20.3%***	25.7%	17.8%	22.1%		
Greater than $156,000	**25.7%**	22.3%	22.4%	28.1%	19%	20%
Education		2011 census[2]				
Post school qualification	**52.6%**	51%	50.9%	53.9%		
Tertiary level	**24.9%***	13%	22.5%	26.7%		

* Binomial tests indicate a significant difference from the survey population

[1] In the 2016 census two income categories were merged

[2] 2016 census figures not available until October 2017

Most survey respondents were long term residents and had lived in the area for an average of 24 years. However, the residency profile of respondents has changed compared to 2016 (Figure 4) with a larger proportion having lived in the Gladstone region for less than 20 years (48% in 2017 vs 38% in 2016).

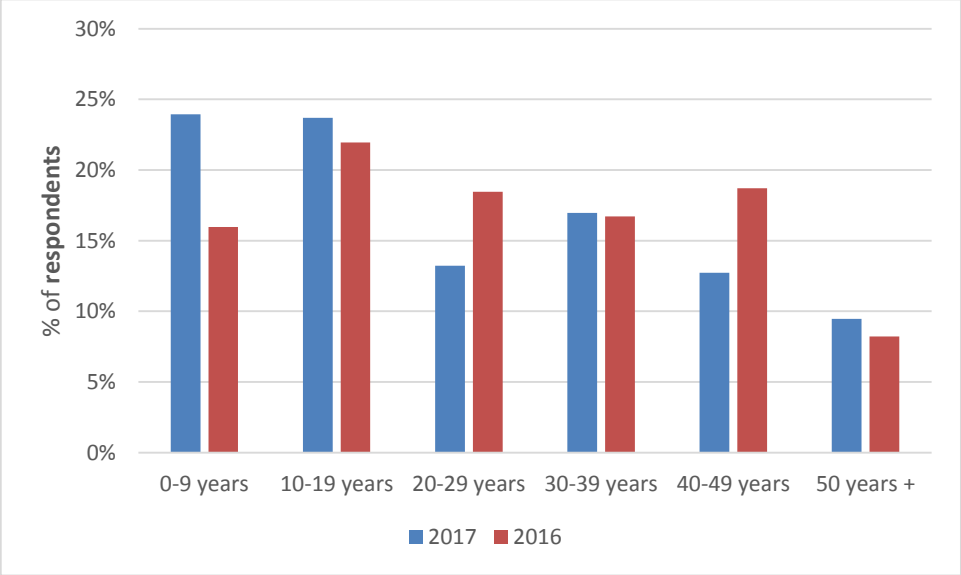


Figure 4: Length of residency in the Gladstone region

The majority of respondents own their homes without a mortgage (32%) or with a mortgage (46%), while 22% are renting. The proportion of rentals has doubled in comparison with last year (11%), and fewer respondents own their homes without a mortgage (45% in 2016). The change is directly related to the use of mobile contacts.

Thirteen percent of participants identified themselves as Traditional Owners of the area which is similar to previous years but higher than the population of 4% Indigenous residents (ABS 2016 Census).

As the age and residency profiles of respondents have changed in comparison to last year, both factors are applied in sensitivity testing and details are reported in the Social and Cultural component results in Appendix C and summarised in Section 4. However, there were insufficient responses (n=16) to test the sensitivity of the youngest age group (18-24 years) as a separate factor.

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* to produce the word clouds (www.wordle.net). 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 importance of aesthetic values ('Beautiful') and 'Fishing' which were the most frequently mentioned. It is not clear the extent to which Fishing is viewed as a recreational or commercial activity or both. However, it was nominated 42 times and 31% of those were from respondents who had not participated in recreational fishing activity in the past year.

The industrial nature of the harbour is recognised (Industrial, Shipping), with some associated negatives (Pollution, Dirty) in lower proportions. Much of the focus is on recreational use of the area (Boats), including specific places such as 'East-Shores', and 'Spinnaker Park'. The variety of recreational activities in the harbour area means that a wide range of words can be applied and their collective importance gets hidden in the word cloud. In contrast, fishing is an activity that can be expressed in a uniform manner and hence its prominence in the word cloud.

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, typically associated with recreation, become more prominent (Beach, Islands, Parks) as well as 'Recreation'

and 'Relaxing' more generally. The impression that the harbour is 'Clean' and the presence of particular species such as 'Dolphins' and 'Fish', also become more prominent. However, it is Fishing, Industrial and aesthetic value (Beautiful) that dominate the word cloud.

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. However, the value of recreational fishing is only estimated in terms of its 'use value' and the word cloud results suggest that there could be important 'non-use values' to consider. In the three-word cloud 37% of 'Fishing' nominations were from respondents who had not participated in recreational fishing in the past year.

The importance of industrial activity is incorporated in the report card as an indicator in the Economic component.

The beauty and aesthetic value of the harbour is not assessed as a separate measure for any of the indicators in the report card, but the benefit it provides would be captured to some extent in the value of recreation which is assessed in the Economic component. A recommendation is made to include Aesthetic value as a new social indicator (Recommendation 3).

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. Three types of recreational activity (beach recreation, land-based recreation and recreational fishing) are assessed as separate indicators. The report card scores for the three recreational indicators are based on the satisfaction ratings for the last recreational trip undertaken in the past year for the three types of activity. These ratings are then weighted by their relative economic value 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 401 responses were collected in the 2017 Gladstone CATI survey. Nearly all respondents (96.5%) had visited the Gladstone Harbour area in the last 12 months (an increase of 5% from last year), and 364 (91%) respondents had visited the harbour for recreational purposes (also a 5% increase from last year).

The majority of respondents (64%) indicated that their recreational use of the harbour had not changed in the last 12 months, but more people reported increased use (20% [3% more than 2016]) than decreased use (15% [3% less than 2016]). There was a significant influence of age in those who

reported a change in recreational activity, and older respondents were less/more likely to have reported an increase/decrease in activity.[4]

Land-based and beach recreational activity was much more prevalent than recreational fishing. Over 90% of respondents had participated in land-based (92%) and beach recreation (91%), while 44% had participated in recreational fishing. In the past 12 months there had been little change in participation in land and beach recreation, but participation in recreational fishing had increased by 5%.

More than a third of respondents (35.7%) indicated they owned a boat. In the last 12 months, 169 (42%) respondents had used a boat ramp for an average of 19 times (average of 8 times for the whole sample). There has been no 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 beach recreation, land-based recreation and recreational fishing (mean scores of 8.11, 8.31 and 6.99 respectively). There has been no statistically significant (Paired-samples T-test) change from 2016 for any activity.

Sensitivity testing (Independent Samples T-test at 5%) indicated that **females** had a significantly **higher** mean satisfaction rating than males for all three activities with mean scores of 8.32 vs 7.89 (p=0.020); 8.54 vs 8.08 (p=0.002) and 7.48 vs 6.74 (p=0.042) for beach, land and fishing recreation respectively. Age did not appear to influence satisfaction ratings and there was no significant difference in the ratings of the 'under 35 year' age group, the '55+ years' age group or the '65+ years' age group.

3.3.2 Annual economic value of recreational activity

The annual economic value of the three types of recreational activity is estimated from the information collected about trip frequency (this survey) and the trip values which have already been established[5] 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).

In 2017 there has been little change in participation frequency for beach and land recreation, and no significant difference (Paired-samples T-test) in trip frequency rates from last year. In contrast, there has been a 5% increase in the participation rate for recreational fishing, but participation frequency has seen a small decline. Overall, there is no statistically significant change (Paired-samples T-test) in the trip frequency rates for recreational fishing from last year. There is also no significant difference in trip frequency rates for any activity since the 2014 baseline.

- **Beach recreation: Avg trips/yr**
  2017: users (n=366) = 32.17; full sample (n=401) = 29.36
  2016: users (n=370) = 34.23; full sample (n=401) = 31.58
- **Other land-based recreation: Avg trips/yr**
  2017: users (n=368) = 38.20; full sample (n=401) = 35.06

[4] Two new age groups were created: 1. = 45 plus years; 2= 55 plus years. There was a significant difference (Pearson Chi-Square crosstab), with those in the 45yr plus and the 55yr plus groups less likely to have reported an increase in their recreation activity at the 5% and 1% level respectively.

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

2016: users (n=374) = 41.33; full sample (n=401) = 38.55

- **Fishing recreation: Avg trips/yr**
  2017: users (n=175) = 15.66; full sample (n=401) = 6.84
  2016: users (n=158) = 19.04; full sample (n=401) = 7.50

Sensitivity testing (Independent Samples T-test at 5%) on the full sample participation frequency rates indicated that for:

- **Beach recreation:** neither age (under 35 years, 55+ years or 65+ years) nor gender had a significant influence on participation frequency rates.
- **Other land-based recreation:** was influenced by the youngest age group with those **under 35 years** having a significantly lower participation frequency rate (mean 25.35 vs 37.37 trips per year: p=0.009) but other age groups (55+ years and 65+ years) and gender were not influential.
- **Fishing recreation:** was not influenced by the different age groups but was very gender specific with males having a significantly higher participation frequency than female (mean 10.62 vs 3.03 trips/yr; p=0.000).

The slight decrease in recreational activity (not statistically significant), along with population stability, results in small decreases in the annual value of recreational activity compared with the previous year.

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 D.

The overall value average annual value of recreational trips for 2017 (see Appendix D for details) is:

- $30.61 million for beach recreation ($31.79 million in 2016)
- $50.80 million for land-based recreation ($54.75 million in 2016)
- $22.73 million for recreational fishing ($24.43 million in 2016)

The total economic value of recreation in the harbour is estimated at $104 million, approximately a third of the economic value of tourism expenditure (Economic performance indicator).

3.3.3 Summary of changes in recreational activity

In the last 12 months there has been little change in either participation frequency or quality (level of satisfaction) for any of the recreational activities in the harbour area.

The age profile of the sample has improved this year, but is still underrepresented by respondents in the under 35 year age group even though mobile coverage substantially increased the response rate of the 25-34 year age group (Table 6).

This may have affected participation in recreational activity in two ways. First, the type of activity and the associated costs may be different for younger people compared to older people which could impact on the economic value of a recreational trip. However, this information is only updated every five years and is not influenced by the age profile of respondents in the 2017 survey. Second, the other two primary factors that affect the score for the report card are participation frequency and satisfaction ratings. Sensitivity testing indicated that gender (with no sample bias) appeared to have a greater impact on satisfactory ratings (all activities) as well as participation frequency (fishing) than age. Testing only revealed a significant influence in the youngest age group (under 35 years) with a lower participation rate in land-based recreation.

3.4 Social component results

The overall grade for the Social component is a B (score of 0.66) which remains unchanged from last year and 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 22 measures applied to determine the scores and grades for the three indicator groups (Table 7).

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 along with information about statistically significant demographic differences.

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.

There is relatively little variation in the scores for two of the indicator groups (Harbour access and 'Liveability and wellbeing') or their associated indicators. More change is apparent in the Harbour usability group related to both changes in data analysis ('Satisfaction with harbour recreational activities' indicator) and a decline in harbour safety ('Marine safety incidents' and Oil spills).

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

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

Social component: 2017 = 0.66 (B) 2016 = 0.66 (B); 2014 = 0.58 (C)									
Indicator Group	**Score**	**Indicators**	**Score**			**Measures**	**Score**		
			2017	**2016**	**2014**		**2017**	2016	2014
Harbour usability	**0.62 C** *2016: 0.66 2014:0.60*	Satisfaction with harbour recreational activities	**0.69**	0.67	0.70	How satisfied last recreational trip	0.70	0.66	0.74
						Quality of ramps and facilities	0.68	0.68	0.63
		Perceptions of air and water quality	**0.56**	0.55	0.46	Water quality (WQ) satisfaction	0.58	0.56	0.39
						Air quality satisfaction	0.47	0.45	0.40
						WQ does not affect harbour use	0.64	0.65	0.58
		Perceptions of harbour safety for human use	**0.60**	0.76	0.38	Marine safety incidents	0.76	0.90	0.24
						Oil spills	0.38	0.88	0.15
						Safety at night	0.64	0.63	0.58
						Happy to eat seafood	0.64	0.60	0.55
Harbour access	**0.66 B** *2016: 0.65 2014: 0.61*	Satisfaction with access to the harbour	**0.72**	0.69	0.67	Fair access to harbour	0.72	0.69	0.67
		Satisfaction with boat ramps + public spaces	**0.65**	0.64	0.60	Frequency of use	0.51	0.51	0.46
						Number of boat ramps	0.69	0.67	0.65
						Access to public spaces	0.72	0.72	0.68
		Perceptions of harbour health	**0.63**	0.62	0.53	Great condition	0.66	0.65	0.54
						Optimistic about future health	0.61	0.61	0.56
						Improved over the last 12 months	0.60	0.61	0.50
		Perceptions of barriers to access *(Note: scores are reversed. A higher score denotes a decrease in the barrier)*	**0.65**	0.65	0.64	Marine debris a problem	0.50	0.51	0.51
						Marine debris affects access	0.72	0.71	0.70
						Shipping reduced my use	0.70	0.69	0.63
						Recreation boats reduced my use	0.67	0.66	0.69
Liveability wellbeing	**0.66** *2016: 0.66 2014: 0.64*	Liveability and wellbeing	**0.66**	0.66	0.64	Makes living in Gladstone a better experience	0.74	0.73	0.71
						Participate in community events	0.54	0.55	0.53

3.4.1 Harbour usability

The Harbour usability indicator group was assessed as a C-grade (score of 0.62), which represents a decline from last year (0.66) but some improvement from 2014 (0.60). This indicator group includes three indicators. This year there has been a notable decline in harbour safety which to some extent is offset by increases in the score for harbour recreation due to changes in data analysis.

Satisfaction with recreational activities

The indicator 'Satisfaction with recreational activities' scored 0.69, which represents an increase compared with 0.67 in 2016 but is more comparable with the 2014 score of 0.70. The increase is directly related to errors in data analysis for the 2016 and 2015 reporting periods[6] and the higher score is a more appropriate assessment of satisfaction with recreational activities in the harbour area.

There are two measures for this indicator. The first measure, 'How satisfied with last recreational trip' (average across the three types of recreational activity [beach land and fishing]) has a score of 0.70 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 0.56 which is a slight increase from 2016 (0.55) 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 is constantly improving. There has been a small improvement in perceptions about water quality, but a slight decline in 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 0.56 in 2016 to 0.58 n 2017.
- 'Air quality satisfaction' (Q41.I think air quality in Gladstone Harbour is in good condition) has improved from 0.45 in 2016 to 0.47 in 2017.
- '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 decreased from 0.65 in 2016 to 0.64 in 2017.

Perceptions of harbour safety for human usage

The indicator 'Perception of harbour safety for human use' received a score of 0.60, which represents a strong decline from 2016 (0.76) but still a major improvement from 2014 (0.38)[7]. Higher scores for the measures in this indicator reflect a benefit or a reduction in adverse perceptions/impacts.

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 (0.64 vs 0.60 in 2016) and a slight change in personal safety (0.64 vs 0.63 in 2016).

The main changes in the score for the indicator relate to strong declines in the scores for the measures 'Marine safety incidents' (0.76 vs 0.90 in 2016) and more notably in Oils spills (0.38 vs 0.88

[6] Details are provided in Recommendation 1 in the 2016 report.

[7] 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 2016). Information about these two measures come from secondary source data. There were 64 reported marine incidents and an incident rate of 13.38 (per 10,000 *Qld regulated ships* [99.8% recreational vessels]) in the Gladstone maritime region in 2016. This represents an increase from the previous year with 57 incidents and an incident rate of 12. The distribution of marine safety incidents across the 10-year array in Queensland is provided in Figure 7. The Gladstone incident rate of 13.38 falls in the 24th percentile, but as higher levels are less desirable this value is reversed to determine the score for the report card (i.e. 1-0.24 = 0.76).

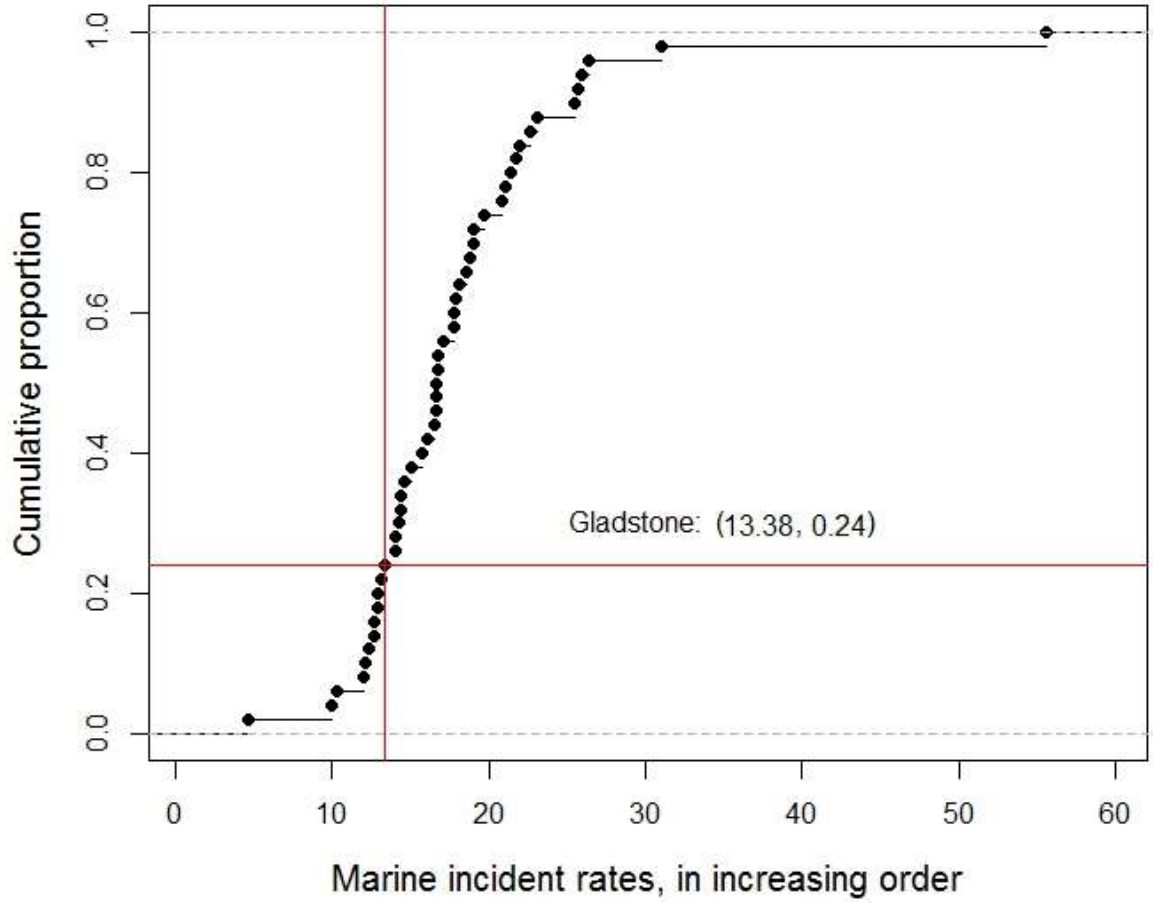


Figure 7: Distribution of marine safety incidents for Queensland

In 2016 there were 18 oil spills reported in the Gladstone maritime region, many more than the five reported last year for 2015, with a threefold increase in the incident rate from 1.05 in 2015 to 3.76 in 2016. However, only 61% of the 2016 spills occurred in the Gladstone Harbour area[8]. The distribution of oil spills across the 10-year array in Queensland is provided in Figure 8. The incident rate of 3.76 falls in the 62nd percentile, but as higher levels are less desirable this value is reversed to determine the score for the report card (i.e. 1-0.62 = 0.38).

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

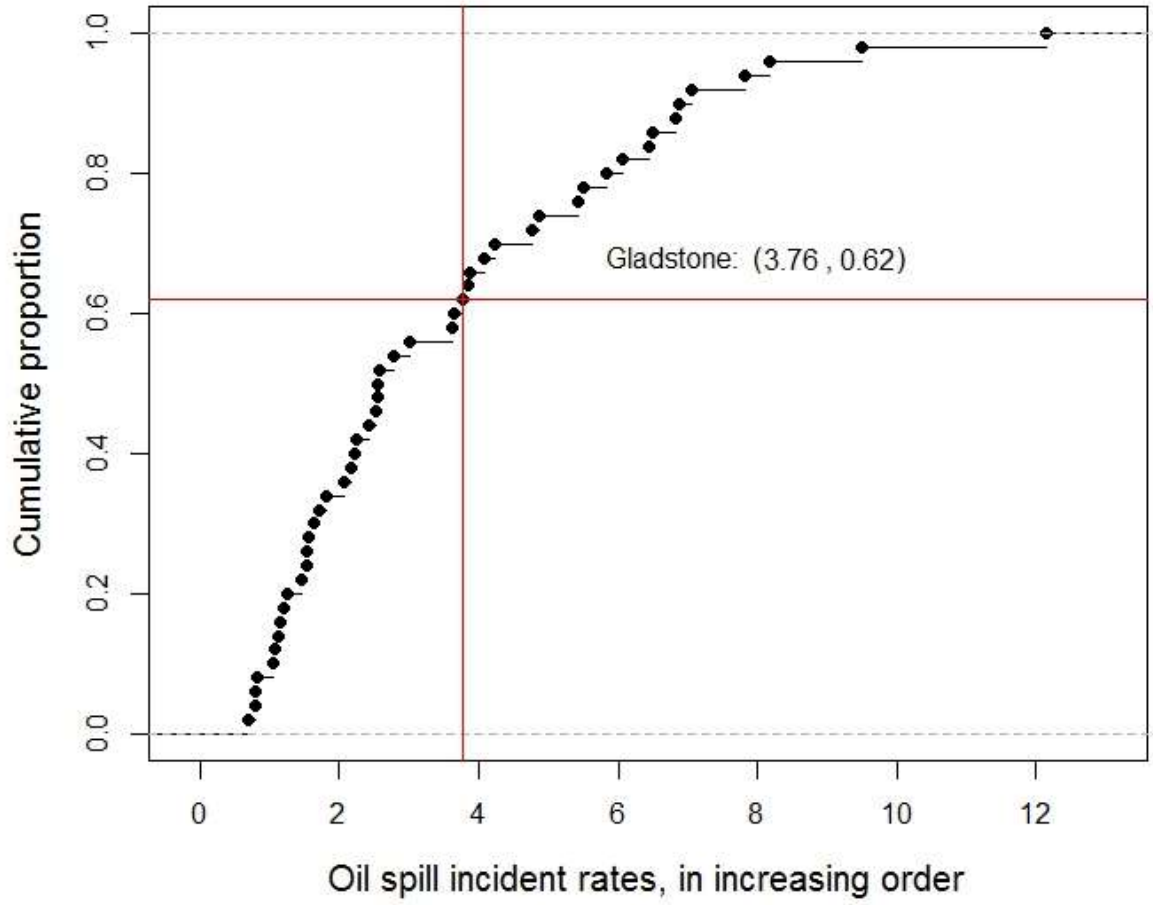


Figure 8: Distribution of oil spills for Queensland

3.4.2 Harbour access

The Harbour access indicator group was assessed as a B-grade and a score of 0.66 with little change from last year (0.65) but some 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, which represents a small but steady increase from 0.69 in 2016 and 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).

Satisfaction with boat ramps and public spaces

The indicator 'Satisfaction with boat ramps and public spaces' scored 0.65, which is a slight improvement compared with 0.64 in 2016 but stronger improvement from 0.60 in 2014. While the measures 'Number of ramps' and 'Access to public spaces' have good scores (0.69 and 0.72 respectively; 0.67 and 0.72 in 2016) the score for the indicator is reduced by the lower score for 'Frequency of use' (0.51) but remains unchanged from 2016. However, most people do not own a boat (64%) or use a boat ramp (58%) as reported in Appendix C.

Perceptions of harbour health

The indicator 'Perceptions of harbour health' scored 0.63, representing a slight improvement compared with 0.62 in 2016 and stronger improvement from 0.53 in 2014. There has been little change in the scores (one point change at most) for all three measures in the last 12 months (Table 7).

Perceptions of barriers to access

The indicator 'Perceptions of barriers to access' scored 0.65, with no change from 2016 and only a slight increase from 0.64 in 2014. Three out of four measures score well (>0.66) suggesting that marine debris did not adversely impact on harbour access and, shipping and boating activity did not adversely impact on harbour use. However, the overall score was reduced by the low score for the problem of marine debris (0.50). There has only been a one point change in all measures since 2016.

3.4.3 Liveability and wellbeing

The 'Liveability and wellbeing' indicator group was assessed as being B-grade (score of 0.66) with no change from 2016, but a slight increase from 0.64 in 2014.

There is only one indicator in this group and the overall score was 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) (0.74 in 2017; 0.73 in 2016) and a lower score for the measure 'Participate in community event' (Q46.I rarely participate in community events in the Gladstone Harbour area) (0.54 in 2017; 0.55 in 2016). There has been a one point improvement for both measures compared with 2016.

3.4.4 Social component summary

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

The Harbour access and 'Liveability and wellbeing' indicator groups have seen relatively little change in the past 12 months with a one point improvement and no change respectively. All but two of the associated measures (n=13) recorded, at most, a one point change (both increases and decreases).

There has been a decline in the overall score for the Harbour usability indicator group, with significant and offsetting changes in two of the indicators. Corrections in data analysis now mean that the score for 'Satisfaction with harbour recreational activities' is higher than last year and better represents community attitudes to recreation in the harbour area which are generally positive.

There has been a considerable increase in the incident rate for marine safety incidents and oil spills. This is a real increase, but the reporting area for both measures is the Gladstone maritime region and not all incidents occur in the Gladstone Harbour area. In addition, there is some concern that these two measures are not well suited for a social indicator about community perceptions and there is a recommendation to remove them.

Five demographic sensitivity factors were tested for their influence on CATI survey responses with details provided in Appendix C and summarised in Section 4. Gender was the most frequent differentiating factor and the 'Perceptions of air and water quality' indicator attracted the most differences.

3.5 Cultural ('Sense of place') component results

The overall grade for the Cultural ('Sense of place') component is a B Grade (score of 0.65) with little change from previous years (score of 0.66 in 2016 and 0.64 in 2014).

Only one indicator group ('Sense of place') was assessed for the Cultural component in this project. 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 as well as sensitivity testing are provided in Appendix C.

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

Since 2016, there has been no change in the scores for three of the indicators and only slight changes in the scores for the other three. In general the improvements since the 2014 baseline have been maintained. The largest change was a 5 point decline in the score for the Continuity indicator which is discussed in more detail below. 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		
		2017	2016	2014		**2017**	2016	2014
Sense of place **0.65** **B** *2016: 0.66* *2014: 0.64*	Distinctiveness	**0.57**	0.59	0.55	No place better	0.51	0.56	0.49
					Who I am	0.62	0.62	0.61
	Continuity	**0.54**	0.59	0.57	How long lived in area	0.43	0.47	0.46
					Plan to stay the next 5 years	0.64	0.71	0.68
	Self-esteem	**0.72**	0.74	0.69	Feel proud living in Gladstone	0.72	0.74	0.69
	Self-efficacy	**0.58**	0.58	0.55	Quality of life	0.67	0.67	0.64
					Input into management	0.50	0.49	0.46
	Attitudes to harbour	**0.81**	0.81	0.80	Key part of community	0.81	0.79	0.79
					Great asset to region	0.80	0.80	0.79
					Great asset to Queensland	0.79	0.80	0.81
	Values of harbour	**0.66**	0.66	0.64	Variety of marine life	0.71	0.71	0.64
					Opportunities for outdoor recreation	0.77	0.77	0.76
					Attracts visitors to the region	0.71	0.72	0.67
					Enjoy scenery and sights	0.76	0.75	0.75
					Spiritually special places	0.52	0.53	0.52
					Culturally special places	0.53	0.53	0.50
					Historical significance	0.54	0.56	0.58

3.5.1 Sense of place

The 'Sense of place' indicator group is assessed through six separate indicators: Distinctiveness, Continuity, Self-esteem, Self-efficacy, as well as 'Attitudes to the harbour' and, 'Values of harbour'.

The rationale behind these indicators is outlined in previous reports (Pascoe et al. 2014; Cannard et al. 2015). The scores for the 'Attitudes to the harbour' indicator and associated measures were the highest, and remain relatively unchanged. The score for the measure 'How long lived in area' (Continuity indicator) was the lowest and had declined in the last 12 months.

Distinctiveness

The Distinctiveness indicator scored 0.57, decreasing from 0.59 in 2016 but increasing from 0.55 in 2014. There are two measures for this indicator, but the decrease is associated with the survey question 'There are other places that are better than the Gladstone Harbour area for the recreational activities that I do' (Q30). The score for this measure (0.51) decreased from 0.56 in 2016. This decline was in part due to the inclusion of more young people in the sample which meant a lower proportion had lived in the region for 20 years or more (38% compared to 48% in 2016). This was identified as a significantly sensitivity factor with respondents who had lived in the region for 20 years of more having higher mean scores for the measure (Appendix C).

There was no change in the score of 0.62 for the measure 'The Gladstone Harbour area is part of who I am' (Q51) with a score of 0.62 in 2016.

Continuity

The Continuity indicator scored 0.54, decreasing from 0.59 and 0.57 in 2016 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 0.43 which had declined from 0.47 in 2016.

The average time respondents had lived in the area declined from 26.5 years in 2016 to 23.9 years in 2017 due to changes in the sample age profile. 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 0.64 but it also represents a decline from 2016 (0.71).

Given the changes in the sample age profile, it is not possible to make any assumptions about any changes in the stability of the Gladstone population.

Self-esteem

The Self-esteem indicator scored 0.72 representing a slight decrease compared with 0.74 in 2016 but an increase from 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.

Self-efficacy

The Self-efficacy indicator scored 0.58 with no change compared with 2016 and a small 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 0.67, with no change from 2016. 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 0.50 but had increased slightly from 0.49 in 2016.

Attitudes to the harbour

The 'Attitudes to the harbour' indicator received the highest score of all indicators in this group. The 2017 score of 0.81 remains unchanged from 2016 and slightly higher than 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 0.81, 0.80, and 0.79 respectively represent little change from last year.

Values associated with the harbour

The 'Values associated with the harbour' indicator received a score of score of 0.66. It remains unchanged from last year and slightly higher than the score of 0.64 in 2014. 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 2016 (one or two points at most).

3.5.2 Cultural component summary

There has been relatively little temporal variation in the scores for the indicators and measures in the 'Sense of place' indicator group, providing little information for commentary on possible trends. Changes in the scores for the Continuity indicator are related to changes in the age profile of the sample.

One of the difficulties in applying these 'Sense of place' measures as indicators for cultural health is that they are sensitive to some demographic factors. This year changes in sample composition appear to have had more impact than any changes that might be related to the harbour. However, the high score for the Attitudes indicator highlights the importance of the harbour to the community.

Six demographic sensitivity factors (one more [Indigeneity] than the social analysis) were tested for their influence on CATI survey responses with details provided in Appendix C and summarised in Section 4. Identifying as a Traditional Owner was the most frequent differentiating factor, followed by gender. The 'Values of Gladstone Harbour' indicator attracted the most differences.

3.6 Economic component results

The overall grade for the Economic component is a B (score of 0.74) which is a slight decline from 0.75 in 2016 and 2014. There are eight 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.

There has been an improvement in the score for Economic performance, with increases in Shipping activity and more notably in Tourism, but Commercial fishing continues to decline. An increase in the unemployment rate has reduced the score for Economic stimulus, while there is no change in score for Economic value (recreation). Full details are provided in the sub-sections below.

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

	Economic component: 2017 = 0.74 (B) 2016 = 0.75; 2014: 0.75							
Indicator group Score/grade	**Indicators**	**Score**			**Measures**	**Score**		
		2017	**2016**	**2014**		**2017**	**2016**	**2014**
Economic performance 0.90 (A) *2016: 0.87 2014: 0.83*	Shipping activity	**0.90**	0.87	0.83	Shipping activity: productivity	0.90	0.87	0.83
	Tourism	**0.90**	0.72	0.60	Tourism expenditure including cruise ships	0.90	0.72	0.60
	Commercial fishing	**0.35**	0.43	0.66	Line fisheries: productivity	0.90	0.27	na
					Net fisheries: productivity	0.30	0.34	na
					Trawl fisheries: productivity	0.25	0.38	na
					Pot fisheries: productivity	0.62	0.65	na
Economic stimulus 0.67 (B) *2016: 0.74 2014: 0.87*	Employment	**0.53**	0.62	0.72	Unemployment statistics for the Gladstone LGA	0.53	0.62	0.72
	Socio-economic status	**0.70**	0.80	0.90	Index of economic resources	0.70	0.80	0.90
Economic value 0.73 (B) *2016: 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	**0.65**	0.66	0.67	Satisfaction rating from CATI survey + value from 2015 survey	**0.65**	0.66	0.67
	Beach recreation	**0.74**	0.75	0.71	Satisfaction rating from CATI survey + value from 2014 survey	**0.74**	0.75	0.71

3.6.1 Economic performance

Economic performance retains an A-grade with the score of 0.90 continuing to increase from 0.87 in 2016 and 0.83 in 2014.

The three indicators of Economic performance are Shipping, Tourism and Commercial fishing with Shipping the dominant performer. In 2015-16, the Gladstone Ports Corporation generated **$479 million** in total income (up from $453M in 2014-15). Tourism expenditure was worth **$317 million** (2015-16), up from $275 million in 2014-15. The 2016-17 GVP for Gladstone Harbour commercial fisheries was worth **$1.93 million** down from $2.83M in 2015-16.

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 Shipping activity indicator has a score of 0.90, which represents a steady increase compared with 0.87 in 2016 and 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 2016-17, there has been a further increase in shipping activity (Figure 9) due to

expanding LNG exports. The mean value of monthly shipping movements for other exports (LNG) increased to 54 in 2016-17 from 44 in the previous year. Coal movements decreased from a monthly mean of 62 in 2015-6 to 57 in 2016-17.

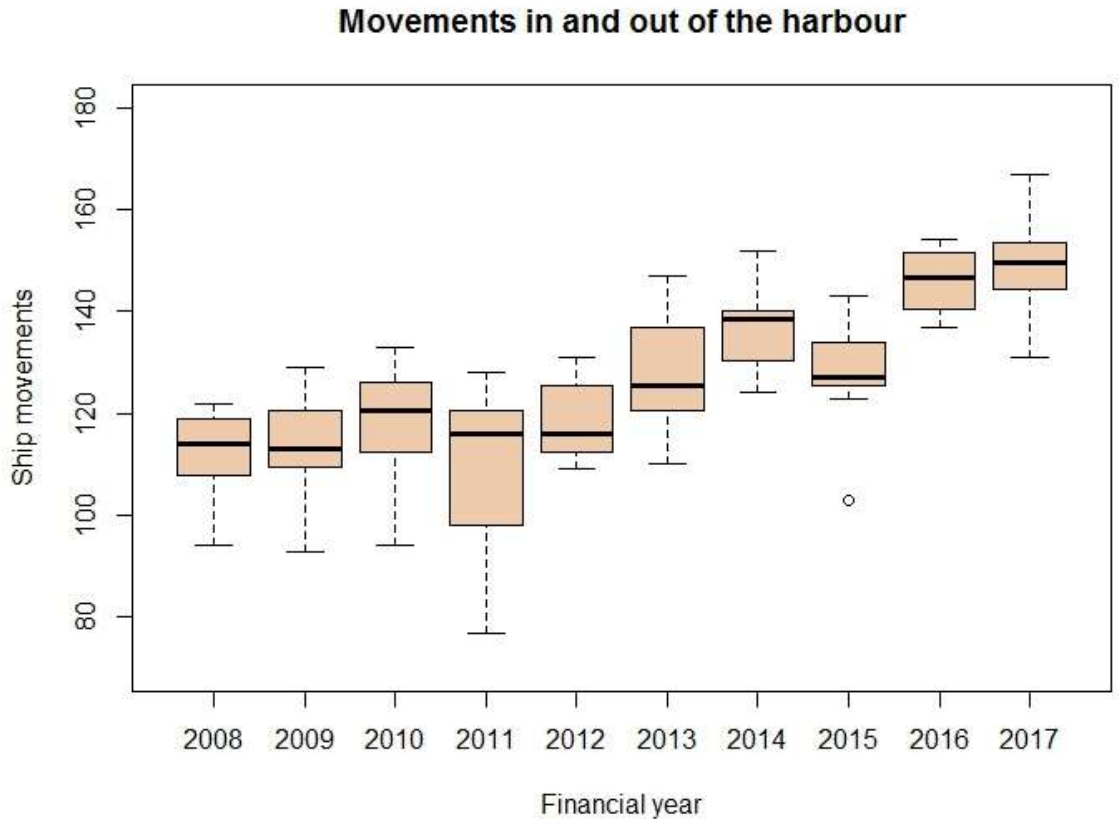


Figure 9: Gladstone Harbour shipping activity, 2008-2017

Shipping activity continues to be dominated by coal exports but there is more variation in activity over time whereas LNG exports have been more stable (Figure 10).

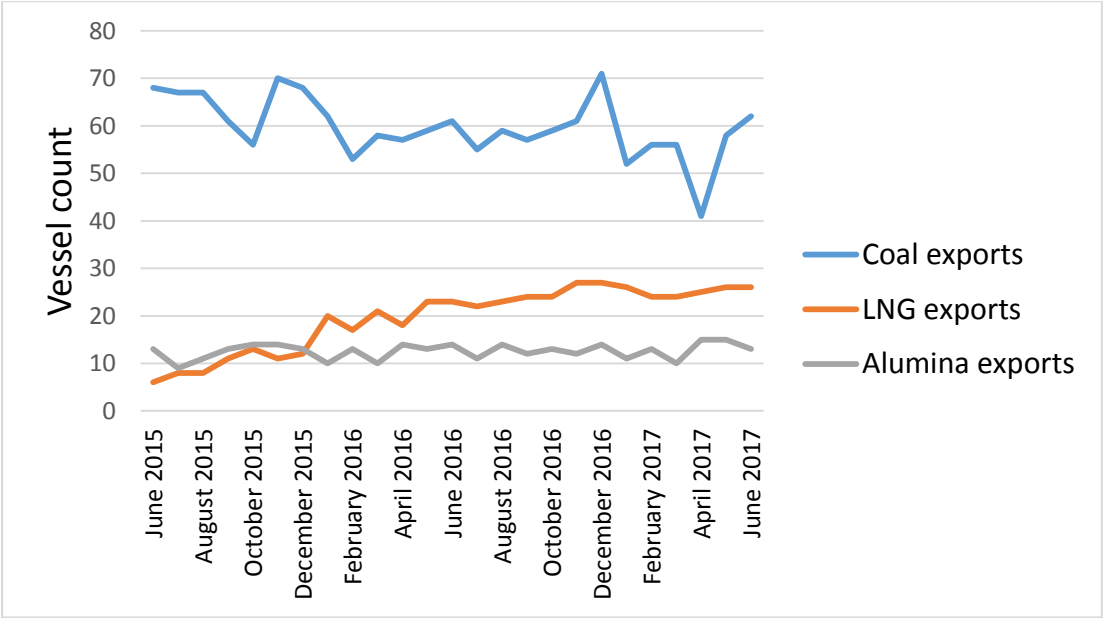


Figure 10: Trends in the three main commodity exports 2015-17

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.

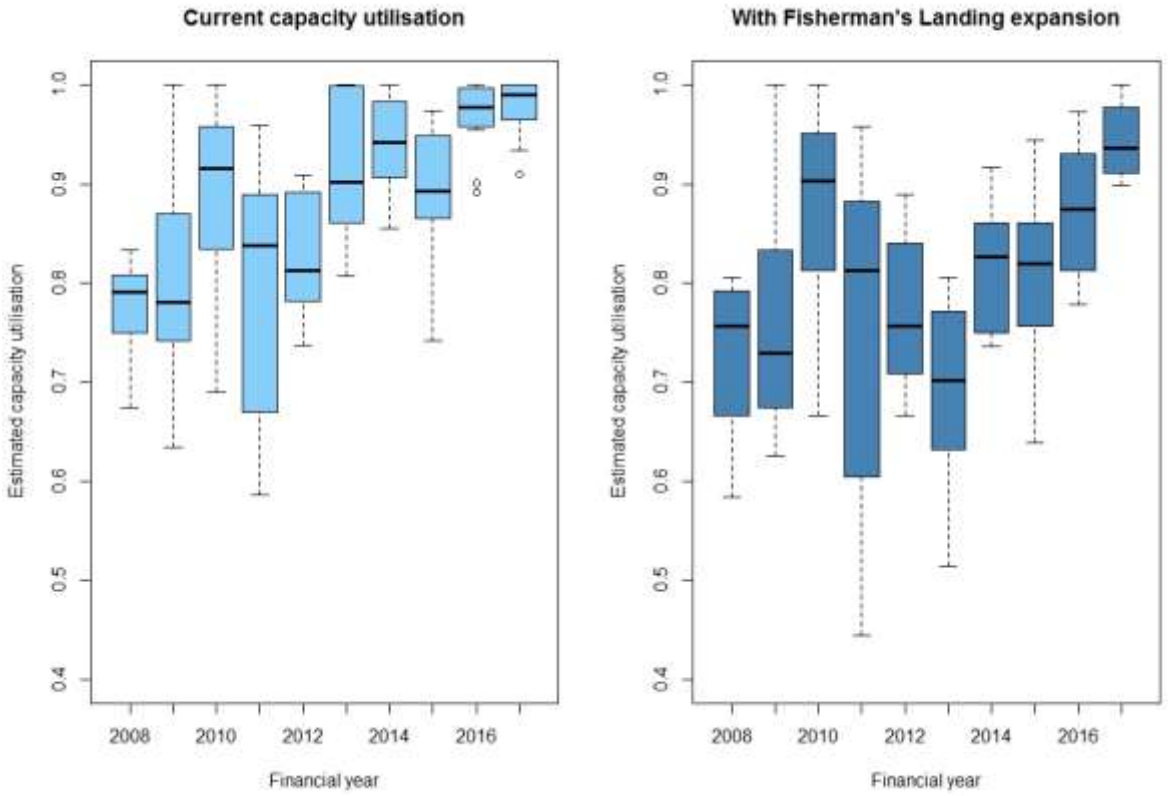


Figure 11: Capacity utilisation with a) current facilities and b) with Fisherman's Landing expansion

Tourism

Tourism has continued its strong growth and the indicator is now an A-grade with a score of 0.90, representing a notable increase from 0.72 in 2016 and 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 $317 million in 2015-16 increasing from $275 million in 2014-15.

In March 2016, the first cruise ship visited Gladstone and in 2015-16 four cruise ships docked at Gladstone Port (Gladstone Ports Corporation 2016: 19), with a carrying capacity of approximately 7850 pax (Pacific Dawn @ 2000 pax and 3 x Pacific Jewel @ 1950 pax). It has been estimated that the total expenditure from both passengers and crew from the four cruise ships was $0.32 million, based on 5404 passenger days and 286 crew days at port with a total expenditure of $0.306 ($56.62/day) for passengers and $0.014 ($48.95/day) for crew (AEC 2016: Table E2).

This amount has been added to the estimated $316.67 million in Tourist expenditure for 2015-16 (Gladstone Regional Council website), but only represents 0.1% of total expenditure ($316.99M).

Commercial fishing

The Commercial fishing indicator has a low score of 0.35 which is a further decline from 2016 (0.43) and 2014 (0.66). This score relies upon the calculation of the Gross Value of Production (GVP) for Gladstone Harbour fisheries for 2016-17 which is based on 2016-17 catch and effort data and the latest price information from 2015. The baseline is a 10 year moving average.

This year, the GVP for Gladstone Harbour fisheries was of $1.93 million, a notable decline from last year ($2.83 million) and 2013-14 ($4.68 million). However, at the time of reporting the 2016-17 dataset was 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 and $2.83 million last year (Figure 12b). Despite the decline in productivity, the Gladstone region remains relatively strong when compared with neighbouring regions (Figure 12a). In 2016-17 the mean GVP from Gladstone was $1.93 million compared with $0.56 million for Rockhampton/Yeppoon and $1.90 million for the Mackay region.

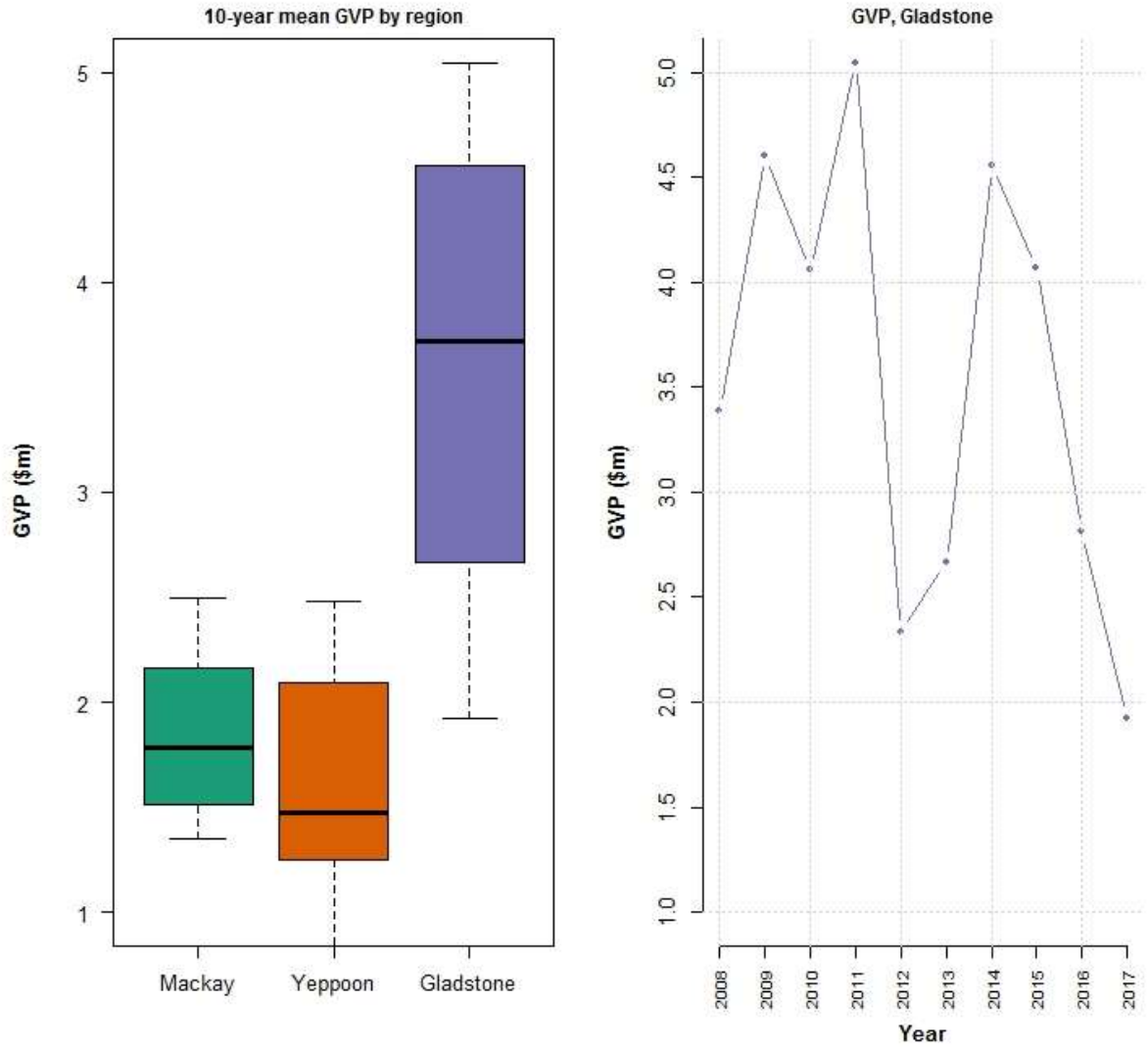
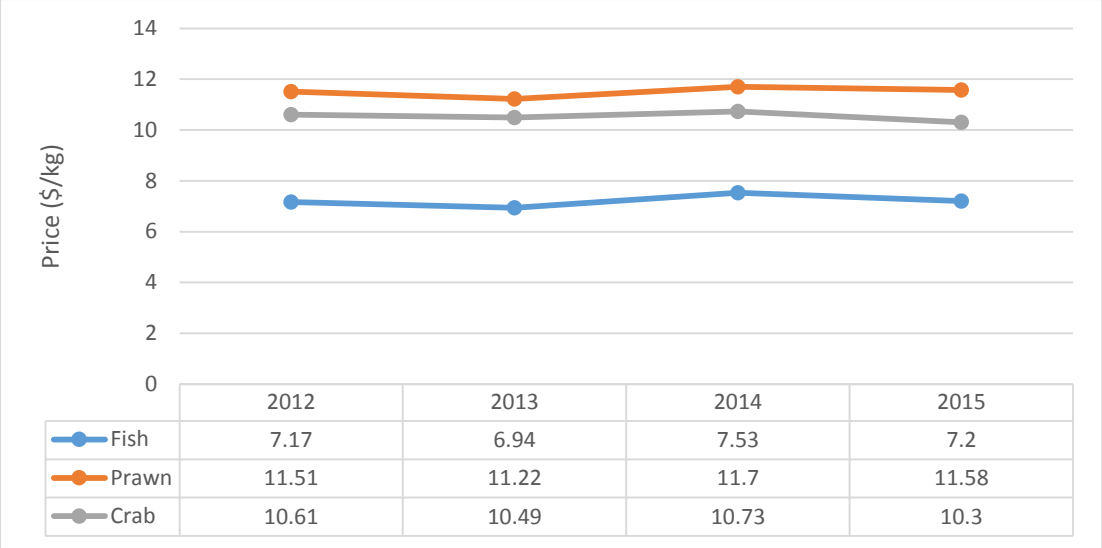


Figure 12: GVP variation for a) the three regional fisheries and for b) Gladstone over time

Prices have remained relatively steady over the four years of reporting with the 2015 price information applied to estimate the GVP for this year (Figure 13).



	2012	2013	2014	2015
Fish	7.17	6.94	7.53	7.2
Prawn	11.51	11.22	11.7	11.58
Crab	10.61	10.49	10.73	10.3

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

The indicator is comprised of scores originating from four measures: Line fisheries (0.90), Net fisheries (0.30), Trawl fisheries (0.25) and Pot fisheries (0.62) (

Table 9) which are then weighted by their relative contribution to GVP, which is dominated by trawl fisheries (44% of production [catch]; 34 % in 2015-16), Net fisheries (35% of production; 36% in 2015-16) and Pot fisheries (20% of production; 27% in 2015-16) (Figure 14).

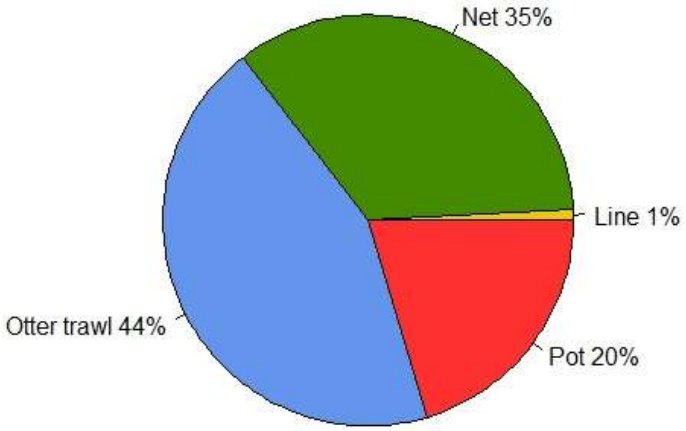


Figure 14: Contribution to total production by fishery sector

Production in the Line fishing sector has more than doubled in the last 12 months, but the high score (0.90) for the measure needs to be treated with caution as there are many missing values in this data set. There is a recommendation to remove it from the analysis. There has been a decline in production for the other three fisheries sectors in the last year but there is a missing value in the data for Net fishing in the Rockhampton/Yeppoon region. The same pattern (increase in Line and decrease in the other fisheries) occurs in the S30 Gladstone grid region.

3.6.2 Economic stimulus

The Economic stimulus indicator group has a B-grade with a score of 0.67 and continues to decline from a score of 0.74 in 2016 and 0.87 in 2014. There are two indicators in this group: Employment and Socio-economic status, with declines in both scores compared with 2016.

Employment

The Employment indicator receives a score of 0.53 representing a decline from 2016 (0.62) 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 2017, the unemployment rate for the March quarter was 7.0% compared to a rate of 6.2% for the same period in 2016. In the last 12 months the relative position of Gladstone deteriorated slightly compared to other LGAs in Queensland from being within 44% to 47% of the cumulative unemployment proportion for the State (Figure 15). Unlike last year, the unemployment rate for Gladstone is now higher than the State unemployment rate (trend) of 6.4% for March 2017[9].

[9] ABS 6202.0, Labour force, March 2017.released 13 April 2017.

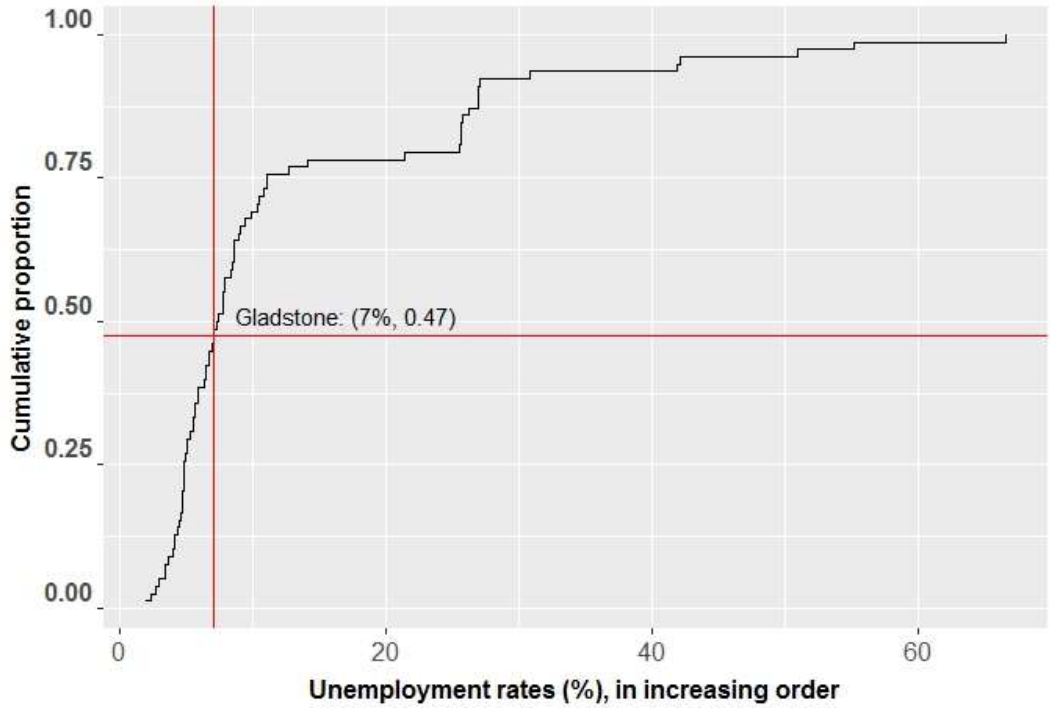


Figure 15: Distribution of unemployment rates for Queensland, March 2017

Socio-economic status

The Socio-economic status indicator continues to decline with a score of 0.70 compared with 0.80 in 2016 and 0.90 in 2014, reflecting the impact of job losses and increased unemployment.

The IER index was estimated at 1005.82 (compared to 1022.86 for last year) which places it in the 70th percentile in the 2011 distribution of LGAs in Australia (Figure 16).

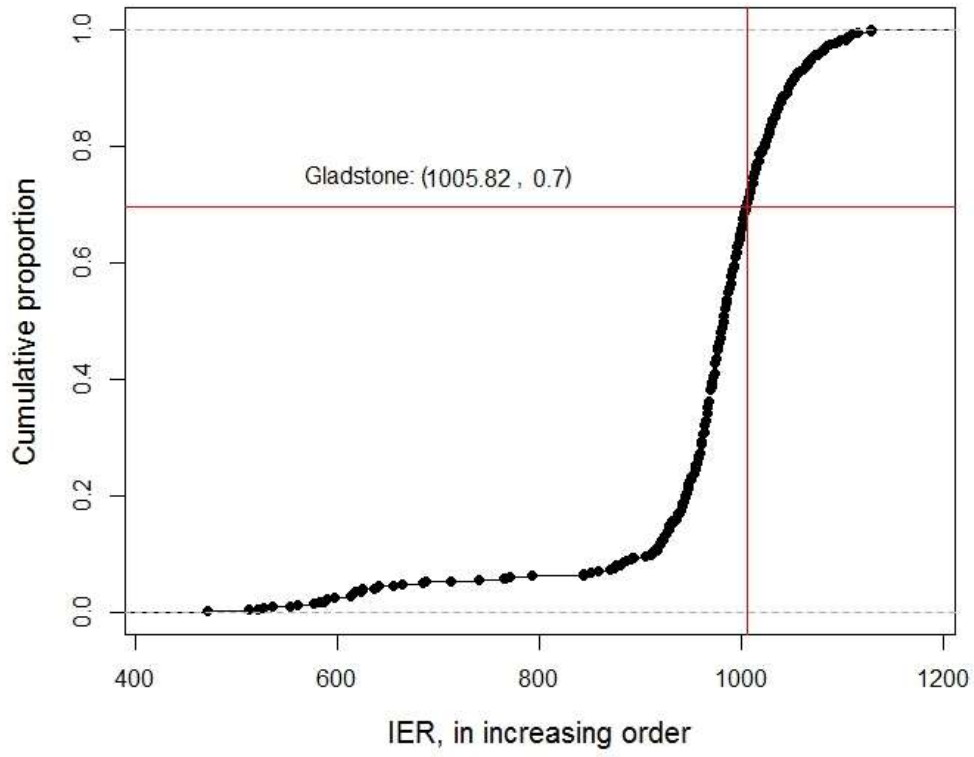


Figure 16: Distribution of IER scores Australia 2011, and 2017 estimate for Gladstone

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. There had been statistically significant decreases in mean household income (Q67 in the CATI survey) (t=4.077; p=0.000), the number of adults over 18 years in the household (Q68 in the CATI survey (t=2.850; p=0.004), and the average number of bedrooms in the home (Q75 in the CATI survey (t=2.078; p=0.038). The decline in mean household income maybe related to the increase in the unemployment rate and all three are possibly connected to some extent to the younger age profile of the sample.

3.6.3 Economic value (recreation)

The Economic value indicator group was assessed as being B-grade with a score of 0.73 which remains unchanged from 2016 and represents a slight decline from 0.75 in 2014. There are three indicators in this group representing the main types of recreational activity: Land-based recreation, Recreational fishing and Beach 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. There is no change of note in in scores for the three indicators/measures.

The total annual value of recreation has decreased by 7% from $111 million in 2016 to $104 million in 2017, a result of small declines (not statistically significant) in participation frequency for all three activities (Appendix D). The average annual value of recreational trips for 2017 is:

- $50.80 million for land-based recreation ($54.75 million in 2016)
- $22.73 million for recreational fishing ($24.43 million in 2016)
- $30.10 million for beach recreation ($31.79 million in 2016)

Land-based recreation and Beach recreation received higher scores than Recreational fishing following the pattern of previous years. In 2017, the scores for Land-based recreation (0.76) remains unchanged from 2016 and 2014. Recreational fishing (0.65) and Beach recreation (0.74) have seen a single point decline from 2016 with a two point decline from 2014 levels (score of 0.67) for fishing recreation and three point decline from 2014 for beach recreation (score of 0.71).

3.6.3 Economic component summary

The overall grade for the Economic component is a B (score of 0.74) which is a slight decline from 0.75 in 2016 and 2014. While there is little change in the overall score, there have been both positive and negative changes in the economic health of the harbour in the last 12 months.

The Economic performance indicator group continues to improve, with increases in Shipping activity and Tourism expenditure, but a decline in Commercial fishing.

- Shipping: generated **$479 million** in total income 2015-16), up from $453M in 2014-15.
    - Associated with increases in LNG exports
- Tourism expenditure was worth **$317 million** (2015-16), up from $275 million in 2014-15.
    - General increase plus additional value for cruise ships
- Commercial fisheries in Gladstone Harbour was worth **$1.93 million** (2016-17) down from $2.83M in 2015-16, but three months production data is missing from the current financial year.
    - Declines in Net (fish) and Trawl (prawns) production are most relevant accounting for 35% and 44% of production respectively.

The Economic stimulus indicator group continues to decline with an increasing rate of unemployment and a decline in the socio-economic status, with statistically significant (at the 1% level) declines in mean household income and the number of adults over 18 years in the household.

The economic value of recreation retains its importance with no change of note in the last 12 months. The estimated value of recreation **$104 million** is a third of the estimated value for Tourism.

Demographic sensitivity tests (summarised in Section 4) indicate gender is the dominant differentiating factor in assessing the scores for recreational activity, influencing satisfaction ratings and participation rates for fishing.

4. Sensitivity testing

In the initial pilot report testing was conducted to determine the sensitivity of outcomes to changes in each measure (Pascoe et al. 2014: Section 3.8.3). Many measures showed little sensitivity but some were more important in their cumulative impact on the indicators and others were not expected to change substantially on an annual basis. There was no recommendation to remove any from the report card assessment.

In 2016, some sensitivity factors (location, gender, boat ownership and length of residency in the area [but not age]) were tested to determine their relative influence on the CATI survey responses for the social and cultural indicators. The results were reported in Appendix C in the 2016 report but not in a summarised format. In 2017 more systematic testing of sensitivity factors was conducted to determine the efficacy of using an online collection method as well as testing for influences in the CATI survey responses. The results are outlined in the relevant sections (Appendix E and Appendix C respectively) and summarised below.

4.1 Online survey collection method

Sensitivity testing was conducted in relation to the online survey collection method (Appendix E) to determine whether the demographic age profile had improved and whether responses differed from those collected in the CATI survey. This would help determine the efficacy of repeating the online survey in the future. The results indicate:

- **Age bias** was exaggerated not alleviated
- **Recreation**
  - Lower participation rates in land-based recreation
  - Lower satisfaction rates for beach and land-based recreation
- **Social indicators**
  - Difference in only 2 out of 20 measures (recreation as above)
- **'Sense of place' indicators**
  - Difference in only 3 out of 17 measures (Continuity and Attitudes)

Overall, there does not appear to be a strong argument that the responses from online respondents are significantly different to those from the CATI respondents. The deterioration in the age profile can be linked to the recruitment mechanism (CATI survey respondents) and a different method would need to be applied for this to be a viable collection methodology in future.

4.2 CATI survey responses for recreation indicators

Each year information about participation frequency rates as well as satisfaction ratings is collected in the CATI survey to update the Economic value (recreation) indicator. Sensitivity testing (Independent Samples T-test at 5%) on the full sample participation frequency rates indicated that for:

- **Beach recreation:** neither age (under 35 years, 55+ years or 65+ years) nor gender had a significant influence on participation frequency rates.
- **Other land-based recreation:** was influenced by the youngest age group with those **under 35 years** having a significantly lower participation (mean 25.35 vs 37.37 trips per year: p=0.009) but other age groups (55+ years and 65+ years) and gender were not influential.
- **Fishing recreation:** was not influenced by the different age groups but was very gender specific with males having a significantly higher participation frequency than female (mean 10.62 vs 3.03 trips/yr; p=0.000).

Gender had a significant influence on satisfaction ratings, with females having significantly higher scores for all three activities.

4.3 CATI survey responses for social and cultural indicators

Details of the sensitivity tests conducted for the CATI survey responses are outlined in Appendix C. In the Social component, five demographic sensitivity factors were tested for their influence survey responses: **age** (under 35yrs and 55yrs +), **gender**, **long term residency** (20 yrs+), and **boat ownership.** There is some correlation between age and long term residency, as well as between gender (males) and boat ownership. The results (Table 10) indicate that gender was the most frequent differentiating factor and the 'Perceptions of air and water quality' indicator attracted the most differences.

Table 10: Results of sensitivity testing for social indicators

		Gender	Age <35 yr	Age>55 yr	Boat	Live 20yr+
Harbour usability						
Satisfaction with harbour recreational activities	2 measures 5 questions	3/5	-	-	-	-
Perceptions of air and water quality	3 measures 3 questions	2/3	-	1/3	1/3	2/3
Perceptions of harbour safety for human usage	2 measures 2 questions	1/2	-	-	1/2	1/2
Harbour access						
Satisfaction with access to the harbour	1 measures 1 questions	-	-	-	-	-
Satisfaction with boat ramps and public spaces	3 measures 3 questions	-	-	-	1/3	-
Perceptions of harbour health	3 measures 3 questions	-	1/3	-	-	-
Perceptions of barriers to access	2 measures 2 questions	-	2/2	1/2	-	-
Liveability and wellbeing	2 measures 2 questions	1/2	-	1/2	-	-
Total # of differences		7/21	3/21	3/21	3/21	3/21
% of questions		**33%**	**14%**	**14%**	**14%**	**14%**

An additional factor, identifying as a **Traditional Owner**, was included in the analysis for the 'Sense of Place' indicators in the Cultural component. The results (Table 11) indicate that identifying as a

Traditional Owner was the most frequent differentiating factor, followed by gender. The 'Values of Gladstone Harbour' indicator attracted the most differences.

Table 11: Results of sensitivity testing for 'Sense of place' indicators

'Sense-of place'		Gender	Age <35 yr	Age>55 yr	Boat	Live 20yr+	T/owner
Distinctiveness	2 measures 2 questions	-	-	-	-	2/2	1/2
Continuity	2 measures 2 questions	1/2	-	-	1/2	-	1/2
Self-esteem	1 measures 1 questions	-	-	-	-	-	1/1
Self-efficacy	2 measures 2 questions	-	-	-	1/2	-	1/2
Attitudes	3 measures 3 questions	-	1/3	1/3	-	1/3	-
Values	7 measures 7 questions	5/7	1/3	-	1/3	1/3	6/7
Total # of differences		**6/17**	**2/17**	**1/17**	**3/17**	**4/17**	**10/17**
% of questions		**35%**	**12%**	**6%**	**18%**	**24%**	**53%**

The mean differences in survey responses for respondents identifying as a Traditional Owner are summarised in Table 12.

Table 12: 'Sense of place': response differences for those identifying as a Traditional Owner (T/O)

Survey questions	T/O	N	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Distinctiveness						
Q30.There are other places that are better than the Gladstone Harbour area for the recreational activities that I do	Yes	53	5.40	3.21	0.44	0.873
	No	330	5.32	2.83	0.16	
Q51.The Gladstone Harbour area is part of who I am	Yes	53	7.92	2.35	0.32	0.000
	No	346	6.58	2.76	0.15	
Continuity						
Q3 How long have you lived in the Gladstone region	Yes	54	30.94	19.70	2.68	0.006
	No	347	22.85	16.63	0.89	
Q53.I do not plan to be a resident of this region in the next 5 years	Yes	52	4.25	3.69	0.51	0.487
	No	342	3.90	3.36	0.18	
Self-esteem						
Q50.I feel proud that I live in the Gladstone community	Yes	54	8.54	1.97	0.27	0.006
	No	347	7.66	2.17	0.12	
Self-efficacy						
Q47.I feel able to have input into the management of the Gladstone Harbour if I choose to	Yes	53	6.23	2.85	0.39	0.043
	No	341	5.35	2.92	0.16	
Q52.The Gladstone Harbour area improves my quality of life	Yes	54	7.76	2.59	0.35	0.089
	No	347	7.14	2.46	0.13	
Attitudes						
Q54.The Gladstone Harbour is a key part of the Gladstone community	Yes	54	9.00	1.44	0.20	0.231
	No	345	8.72	1.59	0.09	
Q58.The Gladstone Harbour area is a great asset for the economy of this region	Yes	54	8.98	1.60	0.22	0.240
	No	345	8.69	1.69	0.09	
Q59.The Gladstone Harbour area is a great asset for the economy of Queensland	Yes	54	8.78	1.69	0.23	0.565
	No	346	8.63	1.72	0.09	

Values						
Q55.I value the Gladstone Harbour area because it supports a variety of marine life	Yes	53	8.26	1.61	0.22	0.022
	No	346	7.58	2.09	0.11	
Q56.I value the Gladstone Harbour area because it provides opportunities for outdoor recreation	Yes	53	8.77	1.40	0.19	0.059
	No	347	8.31	1.69	0.09	
Q57.I value the Gladstone Harbour area because it attracts visitors to the region	Yes	54	8.50	1.81	0.25	0.003
	No	346	7.66	2.18	0.12	
Q60.I value the Gladstone Harbour area because I enjoy the scenery and sights	Yes	54	8.93	1.52	0.21	0.004
	No	346	8.13	1.93	0.10	
Q61.I value the Gladstone Harbour area because there are spiritually special places	Yes	53	7.36	2.60	0.36	0.000
	No	336	5.32	2.77	0.15	
Q62.I value the Gladstone Harbour area because there are culturally special places	Yes	52	7.33	2.50	0.35	0.000
	No	338	5.47	2.69	0.15	
Q63.I value the Gladstone Harbour area because it has historical significance that matters to me	Yes	54	7.07	2.85	0.39	0.001
	No	344	5.70	2.88	0.16	

4.4 Summary

There are some demographic differences in attitudes and opinions that exist in the population and are reflected in the survey sample responses. Gender is the main one and is not associated with any sample bias.

- Females (vs males) had stronger support for the values of the harbour
- Females had higher satisfaction rating for all three recreational activities
- Males had better (higher scores) perceptions about water quality and were less likely to think water quality had influenced their use of the harbour
- Males had higher participation rates for recreational fishing

Respondents identifying as a Traditional Owners have significantly higher mean scores for more than half (59%) of the 'Sense of place' measures, particularly those associated with harbour values. This means there is some sample bias impacting on the results as 13% of survey respondents identified as being a Traditional Owner while Aboriginal people comprise 4% of the population (2016 Census).

There has been some concern that demographic age bias in the survey sample may have undue influence on the results. This year the survey sample matched the population for the older age groups and the bias now only exists in the under 35 year age group. This cohort only comprises 19% of the sample compared with 30% in the population. They have significantly:

- Lower participation rates in land-based recreation
- Some perception differences in 14% of the social questions (3/21) and 12% of the 'Sense of place' measures (2/17)

While age had some impact on results it was not a prevalent factor, which partially alleviates concerns about sample bias in the under 35 year age cohort. However, attempts to increase the proportion of representation from younger respondents in the CATI survey should continue.

There are some sensitivity factors that may be more ephemeral in their impact. For example there was little commonality with the 2016 sensitivity results apart from:

- Males have lower satisfaction rating for all three recreational activities, and boat owners are less satisfied with the level access to public spaces

Overall, there was not strong evidence to suggest that the survey collection mode has an impact on survey responses.

5. 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 0.66 which is comprised a 2.7% probability of being in Grade A, 76.2% in Grade B, 20.9% in Grade C and 0.2% 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 retained. Recent changes in the past year have occurred mainly in the economic component, with continuing improvements in Economic performance (Shipping and particularly Tourism), but also continuing declines in Commercial fishing (Economic performance), Employment and Socio-economic status (Economic stimulus).

An increase in marine safety incidents and oil spills has led to a decline in the score for the social indicator Harbour safety (Harbour usability).

5.1 Social component

The overall grade for the Social component is a B (score of 0.66) which remains unchanged from last year but represents a strong improvement since 2014 (0.58). There has been relatively little change in the scores for two indicator groups but notable changes have occurred in Harbour usability.

The three point decline in the overall score for the Harbour usability indicator group is a result of significant and somewhat offsetting changes in two of the indicators. Corrections in data analysis now mean that the score for 'Satisfaction with harbour recreational activities' is higher and better represents community attitudes to recreation in the harbour area which are generally positive. In the 'Perceptions of harbour safety for human usage' indicator, there has been a significant increase in the incident rate for marine safety incidents and oil spills. This is a real increase, but the reporting area for both measures is the Gladstone maritime region and not all incidents occur in the Gladstone Harbour area. There is a recommendation to remove these measures from this indicator.

5.1.1 Social component summary figures

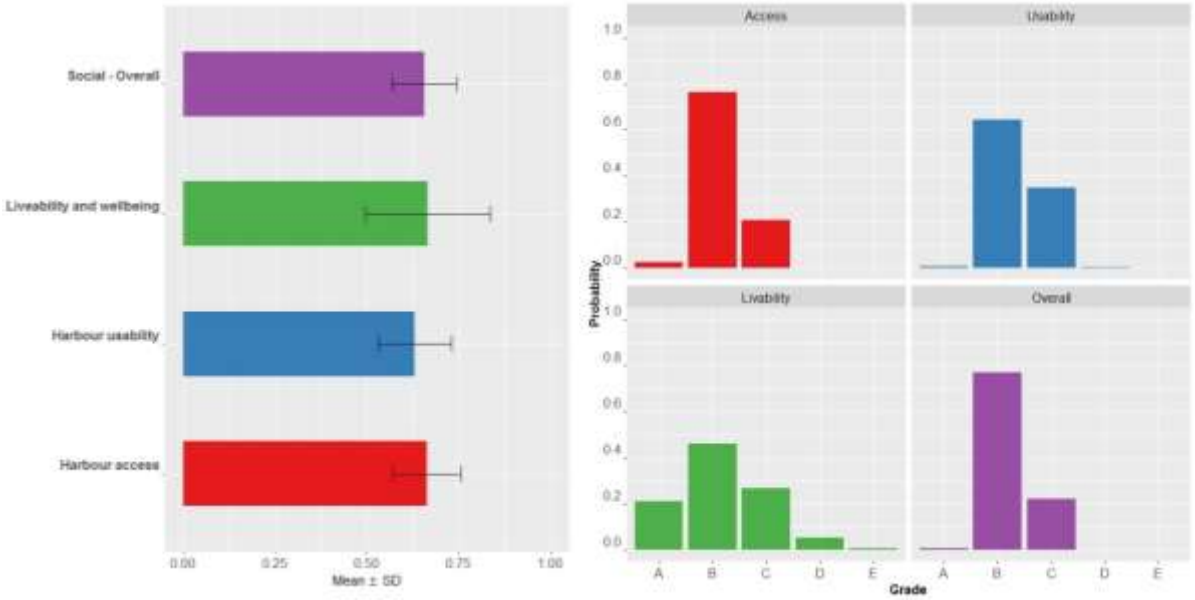


Figure 17: **Social component.** Mean scores, standard deviations and A-E grade distribution for the component and indicator groups

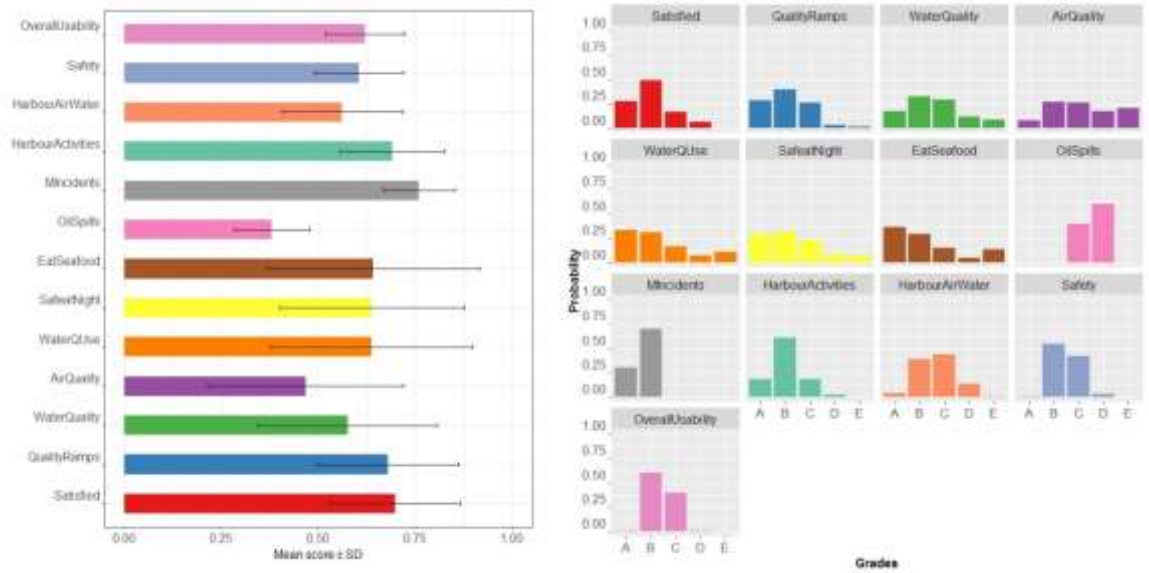


Figure 18**: Harbour usability.** Mean scores, standard deviations and A-E grade distribution for the group, indicators and measures

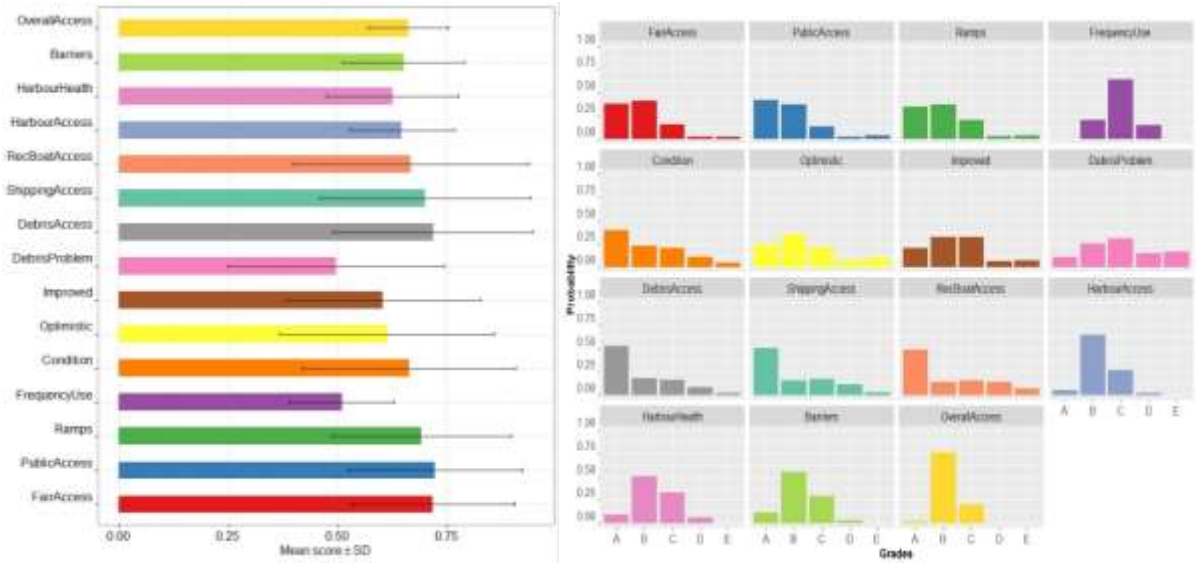


Figure 19: **Harbour access**. Mean scores, standard deviations and A-E grade distribution for the group, indicators and measures

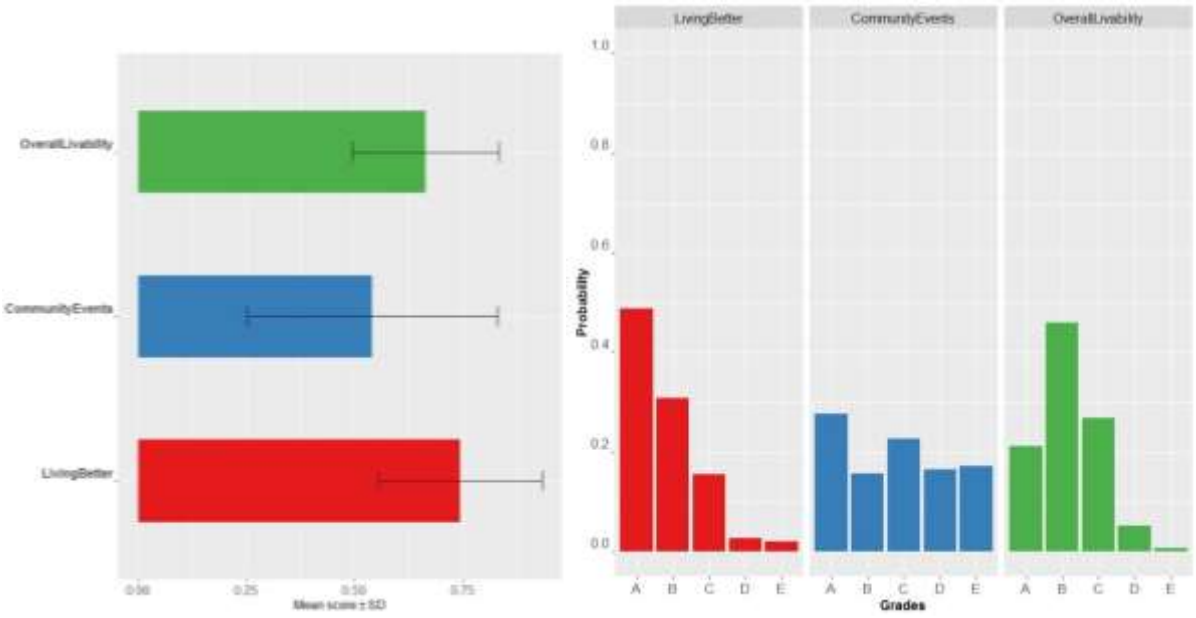


Figure 20**: Liveability and wellbeing.** Mean scores, standard deviations and A-E grade distribution for the group/indicators and measures

5.1.2 Social component summary of scores for trend analysis

There has been a steady increase in the scores for most of the indicators since 2014 (Table 13).

Some improvements have been relatively steady:

- Air and water quality (Harbour usability)
- Access to the harbour (Harbour access)
- Boat ramps and public spaces (Harbour access)
- Harbour health (Harbour access)

Some have fluctuated:

- Safety for human use (Harbour usability)

While others have shown less variation:

- Recreational activities (Harbour usability)
- Liveability and wellbeing (Liveability and wellbeing)
- Barriers to access (Harbour access)

Harbour access seems to have made a sustained improvement since 2014-15. Improvements in harbour useability were evident from 2015, but increased marine incidents adversely impacted on the score for this year (Figure 21).

Table 13: Annual summary of the Social component scores and grades

Social		Group		Indicators	2017	2016	2015	2014	Measures	2017	2016	2015	2014
2017	0.66	**Usability**		Recreational activities	0.69	0.67	0.69	0.70	How satisfied last recreational trip	0.70	0.66	0.70	0.74
2016	0.66	2017	0.62						Quality of ramps and facilities	0.68	0.68	0.66	0.63
2015	0.64	2016	0.66	Air & water quality	0.56	0.55	0.52	0.46	Water quality (WQ) satisfaction	0.58	0.56	0.51	0.39
2014	0.58	2015	0.65						Air quality satisfaction	0.47	0.45	0.43	0.40
		2014	0.60						WQ affects harbour use	0.64	0.65	0.61	0.58
				Safety for human use	0.60	0.76	0.72	0.38	Marine safety incidents	0.76	0.90	0.88	0.24
									Oil spills	0.38	0.88	0.82	0.15
									Safety at night	0.64	0.63	0.60	0.58
									Happy to eat seafood	0.64	0.60	0.57	0.55
		Access		Access to harbour	0.72	0.69	0.68	0.67	Fair access to harbour	0.72	0.69	0.68	0.67
		2017	0.66	Boat ramps+ public spaces	0.65	0.64	0.62	0.60	Frequency of use	0.51	0.51	0.49	0.46
		2016	0.65						Number of boat ramps	0.69	0.67	0.65	0.65
		2015	0.62						Access to public spaces	0.72	0.72	0.70	0.68
		2014	0.61	Harbour health	0.63	0.62	0.58	0.53	Great condition	0.66	0.65	0.60	0.54
									Optimistic about future health	0.61	0.61	0.57	0.56
									Improved last 12 months	0.6	0.61	0.56	0.50
				Barriers to access	0.65	0.65	0.61	0.64	Marine debris a problem	0.5	0.51	0.50	0.51
									Marine debris affects access	0.72	0.71	0.67	0.70
									Shipping reduced my use	0.7	0.69	0.60	0.63
									Recreation boats reduced my use	0.67	0.66	0.64	0.69
		Liveability wellbeing Scores same as indicator		Liveability & wellbeing	0.66	0.66	0.64	0.64	Makes living in Gladstone better	0.74	0.73	0.70	0.71
									Participate in community events	0.54	0.55	0.53	0.53

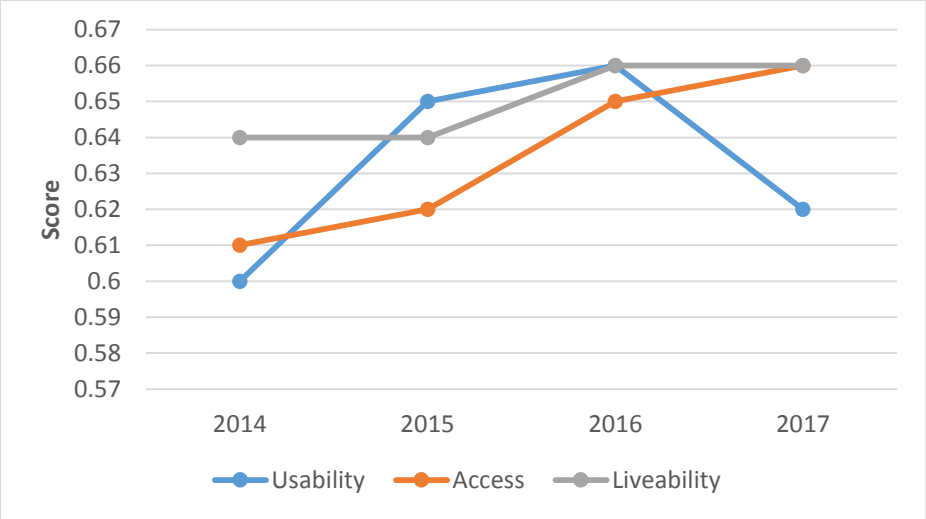


Figure 21: Temporal trends in scores for social indicator groups

5.2 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') component in Figure 22.

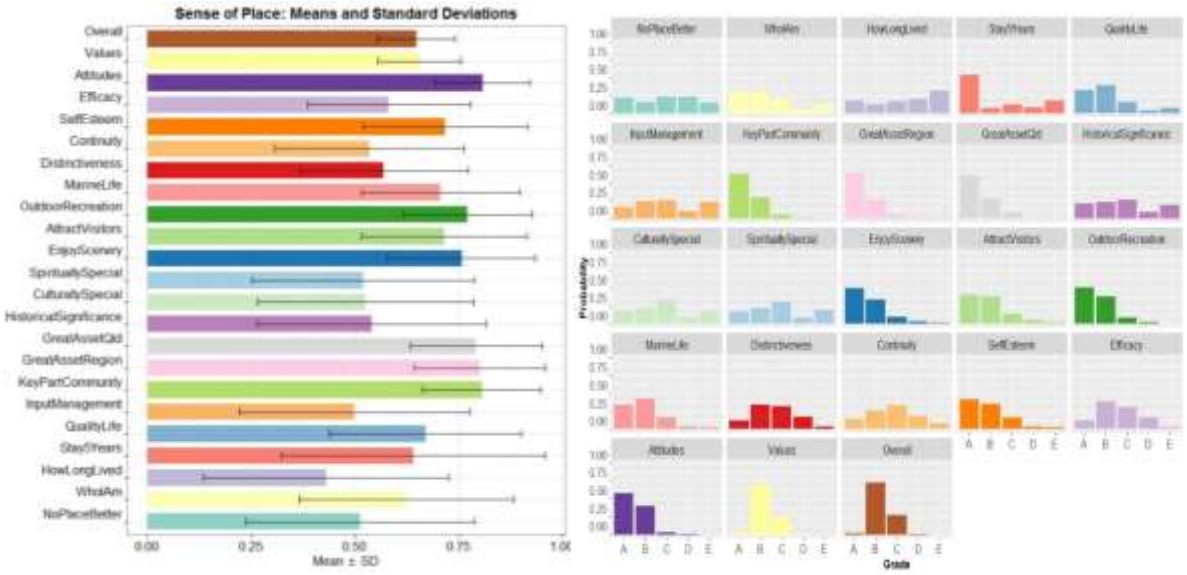


Figure 22: **Cultural ('Sense of place').** Mean scores, standard deviations and A-E grade distribution for the indicator group, indicators and measures

There has been little change in the scores for the 'Sense-of-place' indicator group in the past 12 months, with no change in scores for three indicators and two point decline in another two. The lower score for the Continuity indicator in 2017 is a result of improvements in the age profile of the sample and a higher proportion of younger respondents. Similarly there has been little change in indicator scores over the four year reporting period (Table 14).

At the indicator level, the scores for Attitudes and Values have been quite stable. There has been more variation in the other indicators, but all showing a small increase from 2014, apart from Continuity. The lower score for this indicator in 2017 is a result of improvements in the age profile of the sample and a higher proportion of younger respondents. The main 'stand-out' indicator is Attitudes, which generates higher scores than all other indicators.

Table 14: Annual summary of the 'Sense-of place' scores and grades

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

5.3 Economic component

The overall grade for the Economic component is a B (score of 0.74) which is a slight decline from 0.75 in 2016 and 2014. While there is little change in the overall score, there have been both positive and negative changes in the economic health of the harbour in the last 12 months, continuing a consistent trend since the 2014 baseline (Table 15).

- Economic performance is improving for Shipping and Tourism but declining for Commercial fishing.
- Economic stimulus is declining for both Employment and Socio-economic status.

5.3.1 Economic component summary figures

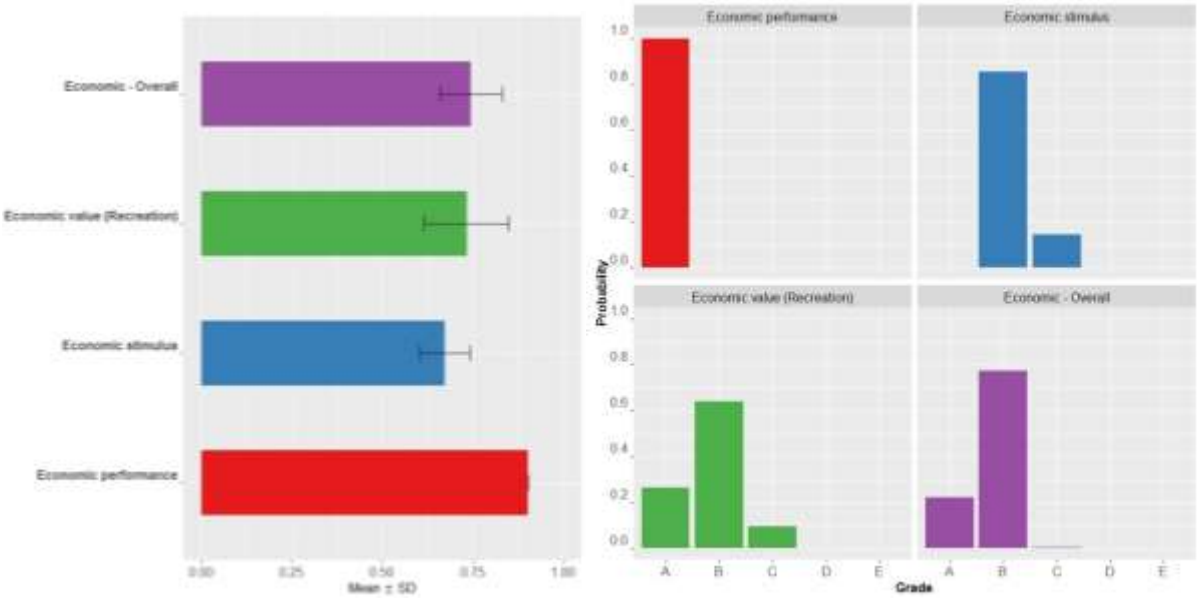


Figure 23: **Economic component**. Mean scores, standard deviations and A-E grade distribution for the component and indicator groups

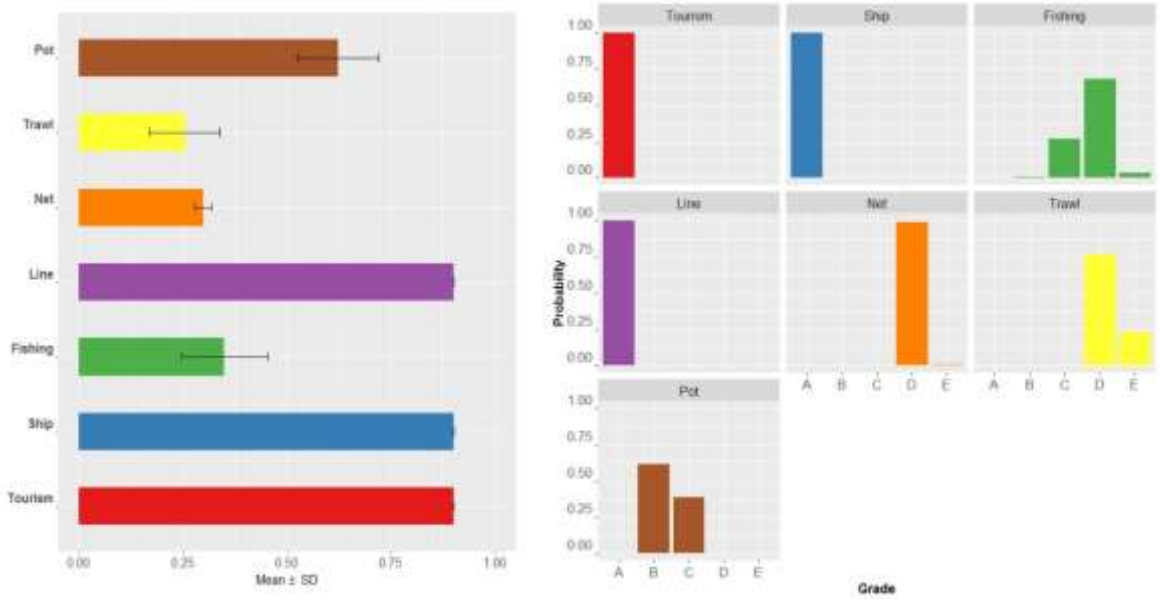


Figure 24: **Economic performance**. Mean scores, standard deviations and A-E grade distribution for the indicator group, indicator/measures and measures

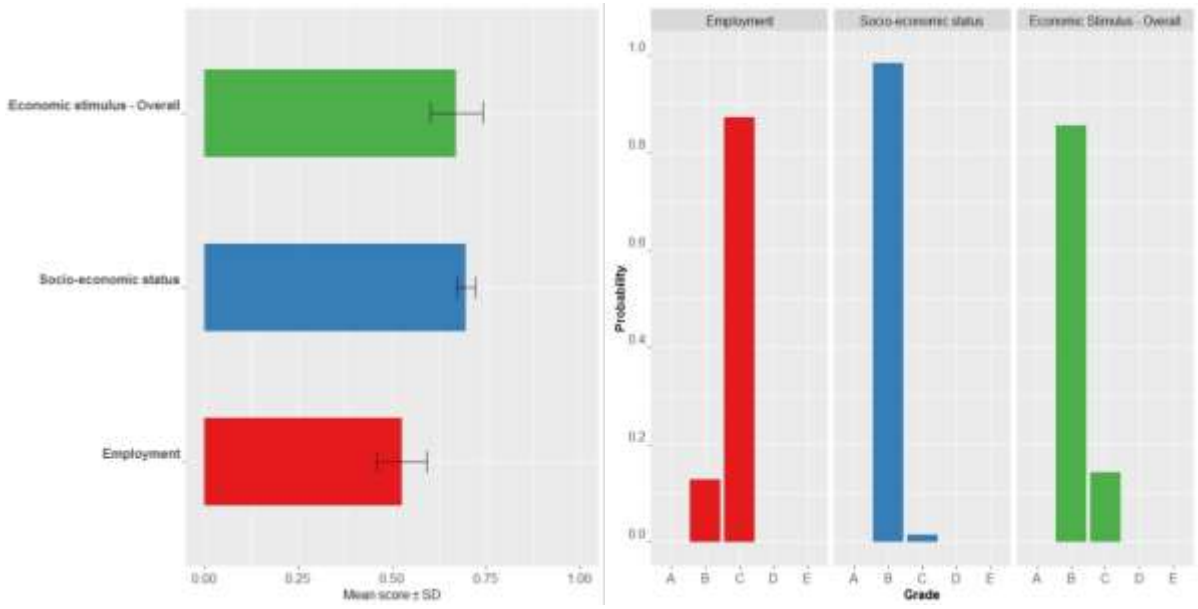


Figure 25: **Economic stimulus.** Mean scores, standard deviations and A-E grade distribution for the indicator group and indicator/measures

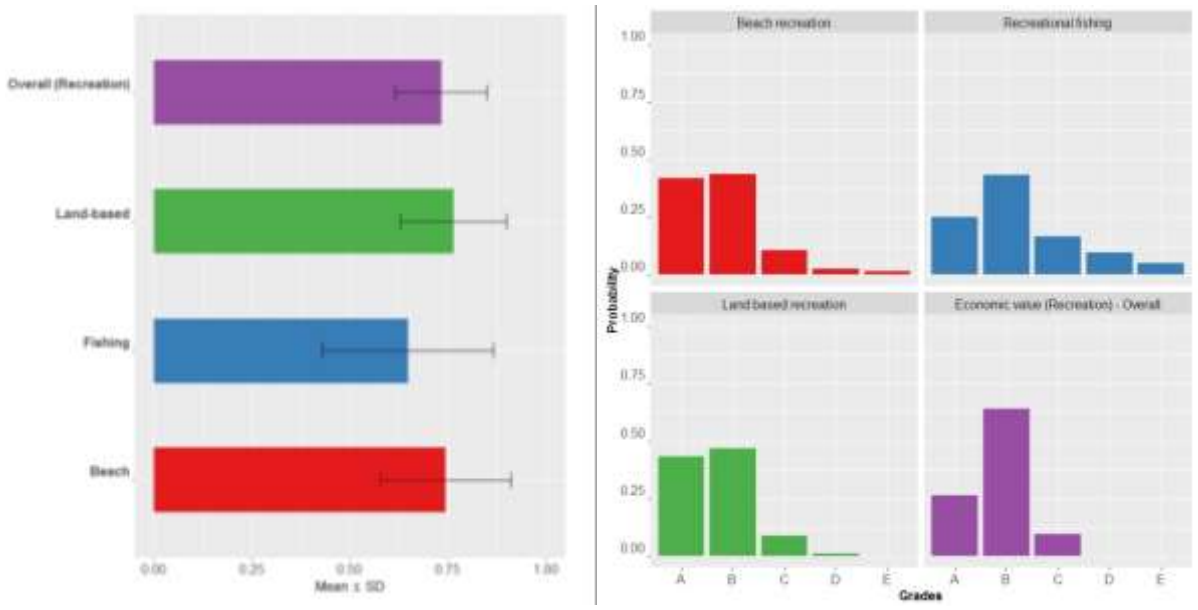


Figure 26: **Economic value (recreation).** A-E grade distribution for the overall indicator group and the indicators/measures

5.3.2 Economic component summary of scores for trend analysis

The score for the Economic component has only changed by one point from the 2014 baseline, but the trends for the three indicator groups are quite different (Table 15). Economic performance is steadily improving, Economic stimulus is steadily declining, and Economic value (recreation) remains stable.

Table 15: Annual summary of the Economic component scores and grades

Economic		Group		Indicators	2017	2016	2015	2014	Measures	2017	2016	2015	2014
2017	0.74	**Performance**		Shipping activity	0.90	0.87	0.82	0.83	Shipping	0.90	0.87	0.82	0.83
2016	0.75	2017	0.90	Tourism	0.90	0.72	0.64	0.60	Expenditure	0.90	0.72	0.64	0.60
2015	0.77	2016	0.87	Fishing	0.35	0.43	0.63	0.66	Line fisheries	0.90	0.27	na	na
2014	0.75	2015	0.79						Net fisheries	0.30	0.34	0.30	na
		2014	0.83						Trawl fisheries	0.25	0.38	0.83	na
									Pot fisheries	0.62	0.65	na	na
		Stimulus		Employment	0.53	0.62	0.64	0.72	Unemployment	0.53	0.62	0.64	0.72
		2017	0.67	Socio-econ status	0.70	0.80	0.95	0.90	Index Econ Res	0.70	0.80	0.95	0.90
		2016	0.74										
		2015	0.82										
		2014	0.87										
		Value(Rec)		Land recreation	0.76	0.76	0.73	0.76	Land rec	0.76	0.76	0.73	0.76
		2017	0.73	Fishing Rec	0.65	0.66	0.71	0.67	Fishing Rec	0.65	0.66	0.71	0.67
		2016	0.73	Beach rec	0.74	0.75	0.70	0.71	Beach rec	0.74	0.75	0.70	0.71
		2015	0.72										
		2014	0.75										

6. Recommendations

6.1 Modifications to existing measures

6.1.1 'Marine safety incidents' and 'Oil spills' Marine (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. This was discussed with the ISP earlier in the year and is documented here for reference.

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 2016 there were 18 oil spills reported in the Gladstone maritime region, but only 61% of these occurred in the Gladstone Harbour area. Currently no editing of the dataset is conducted in line with established methodology, but would be possible.

Furthermore, in previous years the scores for these two measures have returned a much higher score (A-grade) than the scores for the other two measures (C–grade). When combined, the indicator attracts a B-grade which is not a reflection of the scores for any of the measures.

Recommendation 1: It is recommended 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).

6.1.2 Line fishing measure (Commercial fishing indicator)

Commercial fishing includes a combination of four types of fishing as indicator measures: Line (fish), Net (fish), Trawl (prawns) and Pot (crabs). While data for Net, Trawl and Pot fisheries contain values

for each year (although there is a missing value for net fishing in the 2016-17 dataset). Line fishing has many missing values.

There are 30 cases for each of the four fishing sectors in the 10-year dataset (three regions per year). Over the current 10-year array (2007-08 to 2016-17), there are 17 missing values (56.7% for Line fishing; one (3.3%) for Net fishing and none for Trawl or Pot fisheries. Sensitivity testing was conducted to determine the impact on the report card score of treating missing values under different scenarios. The results (outlined in the methods section) indicate that replacing the missing values with zero or replacing them with the mean value makes little difference to the score. Removing Line fishing completely also makes little difference to the indicator score as the sector represents a small proportion (1-2%) of total production. A recommendation is made to remove Line fishing as a measure from the Commercial fishing indicator.

Recommendation 2a: It is recommended that the Line fishing measure be removed as a measure for the Commercial fishing indicator.

Furthermore, there is some time lag in updating the QFish data sets. The latest data accessed for this report is missing information for the last three months of the financial year. The dataset is also continually being updated throughout the year. It would be useful to delay the submission of this report for as long as possible to maximise the benefits of an updated database. The constant updating also implies that it would be useful to update the previous year's data for the 10-year array applied each year in the analysis. Another more manageable option would be to change from applying data for the financial year (which matches the reporting period for the other two measures of economic performance) to applying data for the calendar year.

Recommendation 2b: It is recommended that the reporting period for the commercial fishing indicator be amended from the financial year to the calendar year.

6.2 Creation of new indicators/measures

6.2.1 Data generated from primary sources (CATI survey)

Aesthetic value

In all four years of reporting, 'Beautiful' has been the first word most frequently mentioned in the word cloud analysis, highlighting the importance of the aesthetic value of the harbour. No assessment is currently made of this value in the report card. Some elements of aesthetic value are incorporated in recreational activity/value and may influence participation frequency as well as satisfaction ratings. However, this value is hidden and currently the beauty of the harbour is not being captured as a stand-alone attribute despite its importance.

It is recommended that a new social indicator 'Aesthetic value' be created. It could legitimately be included in the Useability group or as its own indictor group. However, it is recommended that it be included in the 'Liveability and wellbeing' group because the indicators in this group could be strengthened and a new indicator of aesthetic value would improve the assessment. It is also recommended that there be more than one accompanying measure to capture different aspects of aesthetic value such as visual beauty, natural beauty, and possibly some measure of the visual pleasure from vicarious use, such as watching others enjoying the harbour.

This information is easily collected in the CATI survey, by including additional questions such as:

- I enjoy going to the harbour because it is beautiful to look at (visual beauty)
- I enjoy going to the harbour because of its natural beauty (natural beauty)
- I enjoy watching other people using the harbour for recreation (visual/ vicarious use)

Recommendation 3: It is recommended that a new indicator of Aesthetic value be created in the 'Liveability and wellbeing' indicator group.

Other (non-fishing) water based recreation

Sufficient information was collected in the 2017 CATI survey to estimate the economic value of a water-based recreation trip. This is the missing component in the four types of recreational activity/value initially envisioned in the 2014 pilot report. It is recommended that this now be included as the fourth indicator of Economic value (recreation). Standard information on participation frequency and satisfaction ratings on all four activities would be collected on an annual basis. With four indicators it would be possible to collect information to update the recreational trip value for each activity on a rotating annual basis and so each value would get updated every four years instead of the five years recommended in Pascoe et al (2014).

Recommendation 4: It is recommended that 'Other (non-fishing) water-based recreation' be included as a fourth indicator/measure of recreational activity in the Economic value (recreation) indictor group.

6.2.2 Data generated from secondary sources

A number of potentially new data sources have been considered. These were discussed with the ISP earlier in the year and are documented here for reference.

Improved data sources for the tourism indicator

Tourism expenditure is applied as the measure for the Tourism indicator. The current data set is constructed from two different sources and is updated with information from the Economic Profile on the Council website (Details are outlined in the 2016 report: p.17). Access to this data relies on the Council continuing to fund the consultants who provide the information. Finding new more robust sources of data is a priority. However, further investigation did not reveal any new potential data sources.

There are two primary sources of data on Tourism: ABS data and data from the International and Domestic visitors' surveys run by Tourism Research Australia (TRA). This data is republished by other organisations who:

- republish ABS data (e.g. Qld Govt Statisticians Office) but more up to date information is available from ABS
- access and apply ABS data in their own Input/Output models , e.g. REMPLAN (used for the Economic profile on the Council website)
- access and apply TRA data

The following data sources are available but none are suitable

- ABS: 5249.0 - Australian National Accounts: Tourism Satellite Account, 2015-16
    - Data is not available at the LGA level only for a *Tourism region* (Southern GBR: Capricorn, Gladstone and Bundaberg)
- ABS: 8635.0 –Tourism Accommodation, Australia, 2015-16
    - Does not separate visitors and business stays
- TRA Visitors survey
    - sample size for Gladstone is not reliable as there is no specific segmentation
    - They do publish an LGA profile for Gladstone but a four year average is applied as the sample is insufficient to publish annually.

Recommendation 5: The search for new sources of data to measure the economic performance of the Tourism sector should continue.

New indicator of 'business activity' to be included in the Economic stimulus group

The ABS regularly release three sources of data which could potentially be applied as measures for an indicator of business activity. These sources were detailed and discussed with the ISP earlier in the year and are noted below for reference. Further details are available on request.

- ABS: 8635.0 Tourism Accommodation, Australia, 2015-16
- ABS: 8731.0 Building Approvals, Australia, Dec 2016
- ABS: 8165.0 Counts of Australian Businesses, including entries and exits Jun 2012- Jun 2016

Currently, there are only two indicators in the Economic stimulus group and the score is dominated by the unemployment rate as it is both a separate indicator as well as being correlated with components in the indicator for socio-economic status. It would be useful to include an indicator of economic activity in this group.

Recommendation 6: Consideration be given to including a new additional indicator of business activity for the Economic stimulus indicator group.

6.3 Data collection

In 2017, a parallel online survey was trialled as an alternative collection method. The cost of developing the online survey instrument has now been incurred and the cost of running an online survey in the future will be much lower. It is a resource that should not be wasted. The main limiting factor is in the recruitment process for respondents.

Recommendation 7: It is recommended that a recruitment process be developed within GHHP to start building a representative internet panel for the community survey. Email addresses of willing participants could be collected throughout the year from a range of potential sources.

6.4 Summary of recommendations

Recommendation 1: It is recommended 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).

Recommendation 2a: It is recommended that the Line fishing measure be removed as a measure for the Commercial fishing indicator.

Recommendation 2b: It is recommended that the submission of this report be delayed for as long as possible to allow for data updates and that each year the commercial fishing production data for the previous year be updated for the 10-year array.

Recommendation 3: It is recommended that a new indicator of Aesthetic value be created in the 'Liveability and wellbeing' indicator group.

Recommendation 4: It is recommended that 'Other (non-fishing) water-based recreation be included as a fourth indicator/measure of recreational activity in the Economic value (recreation) indictor group.

Recommendation 5: The search for new sources of data to measure the Economic performance of the Tourism sector should continue.

Recommendation 6: Consideration be given to including a new additional indicator of business activity for the Economic stimulus indicator group.

Recommendation 7: It is recommended that a recruitment process be developed within GHHP to start building a representative internet panel for the community survey. Email addresses of willing participants could be collected throughout the year from a range of potential sources.

References

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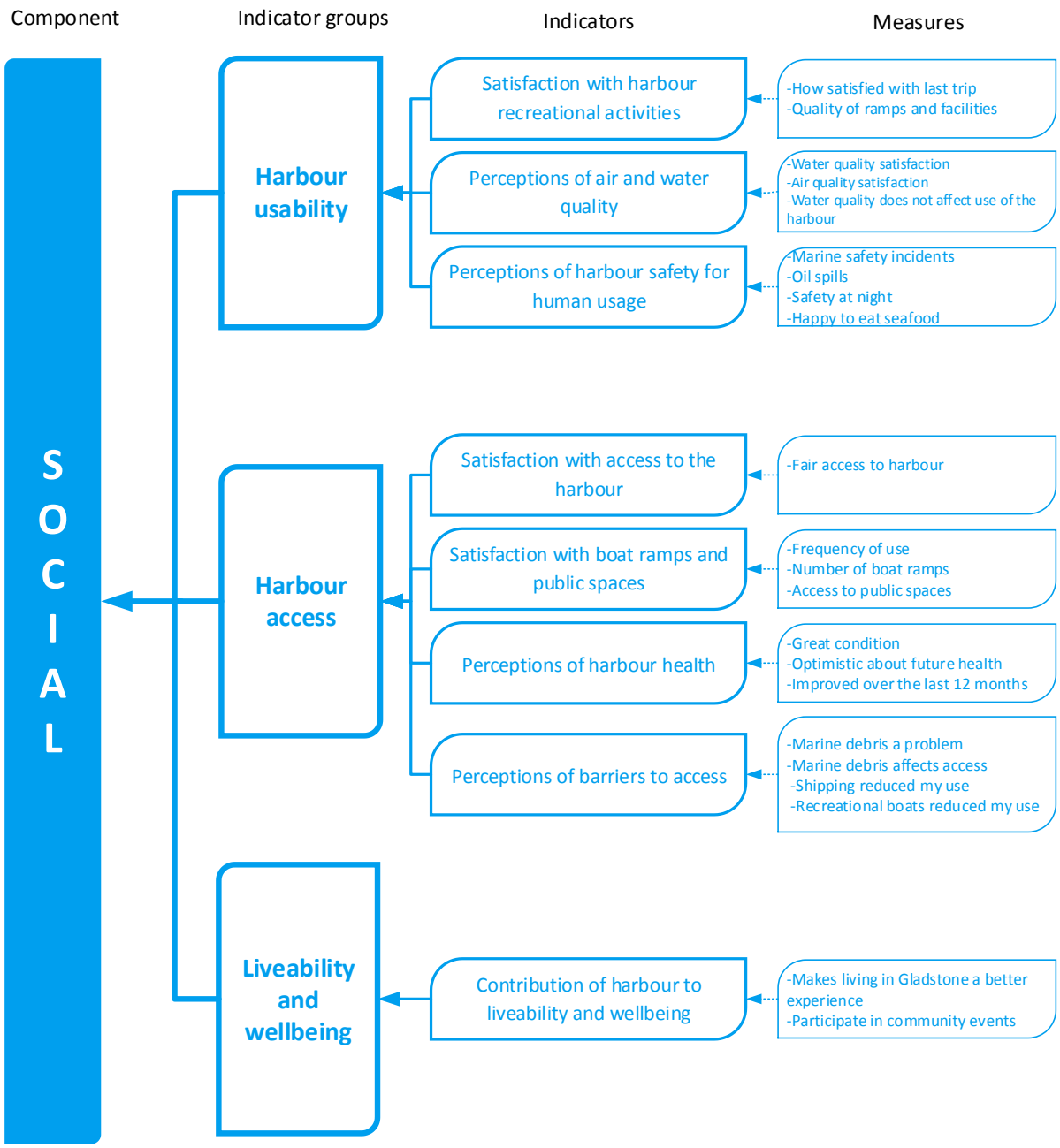
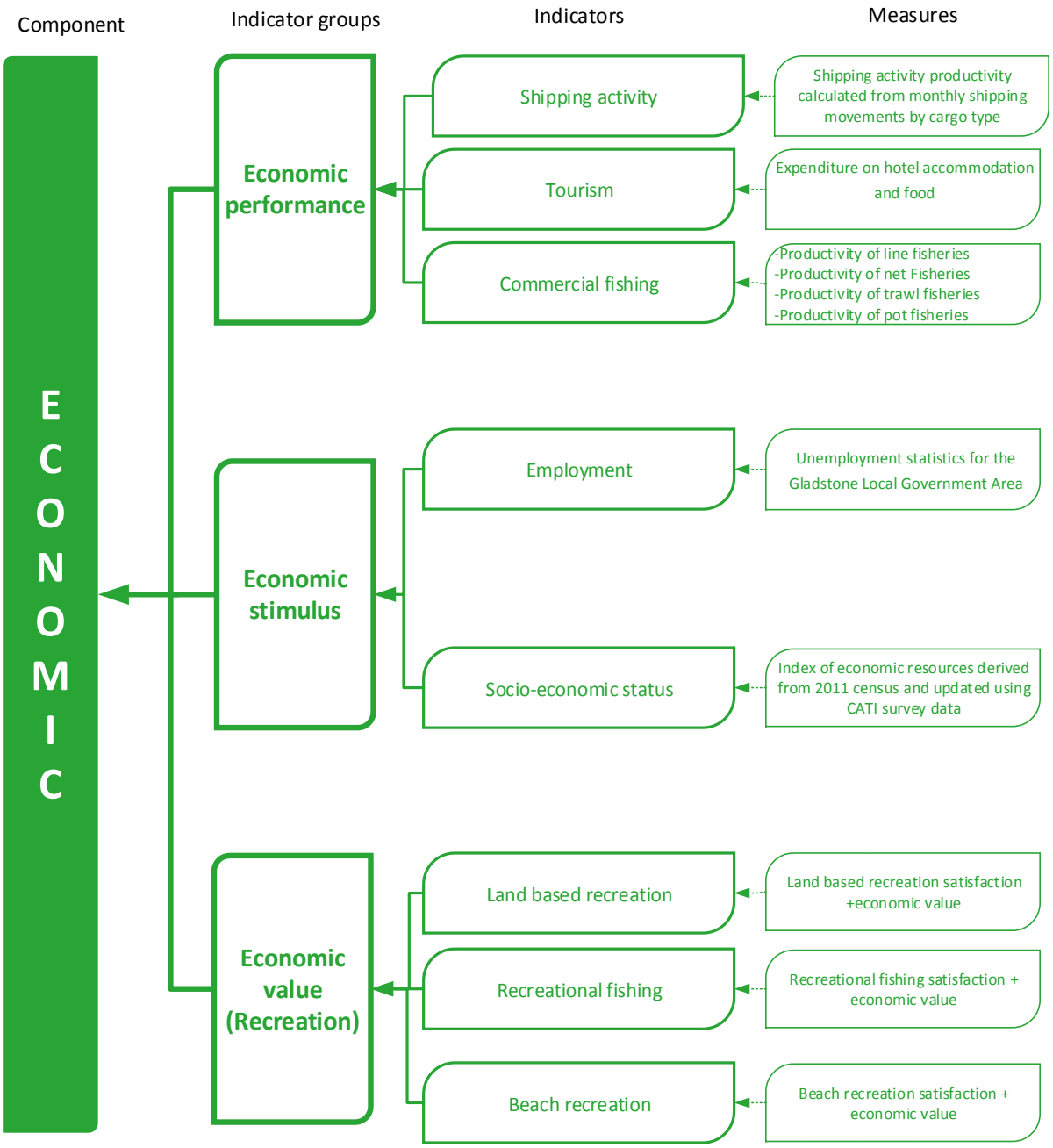
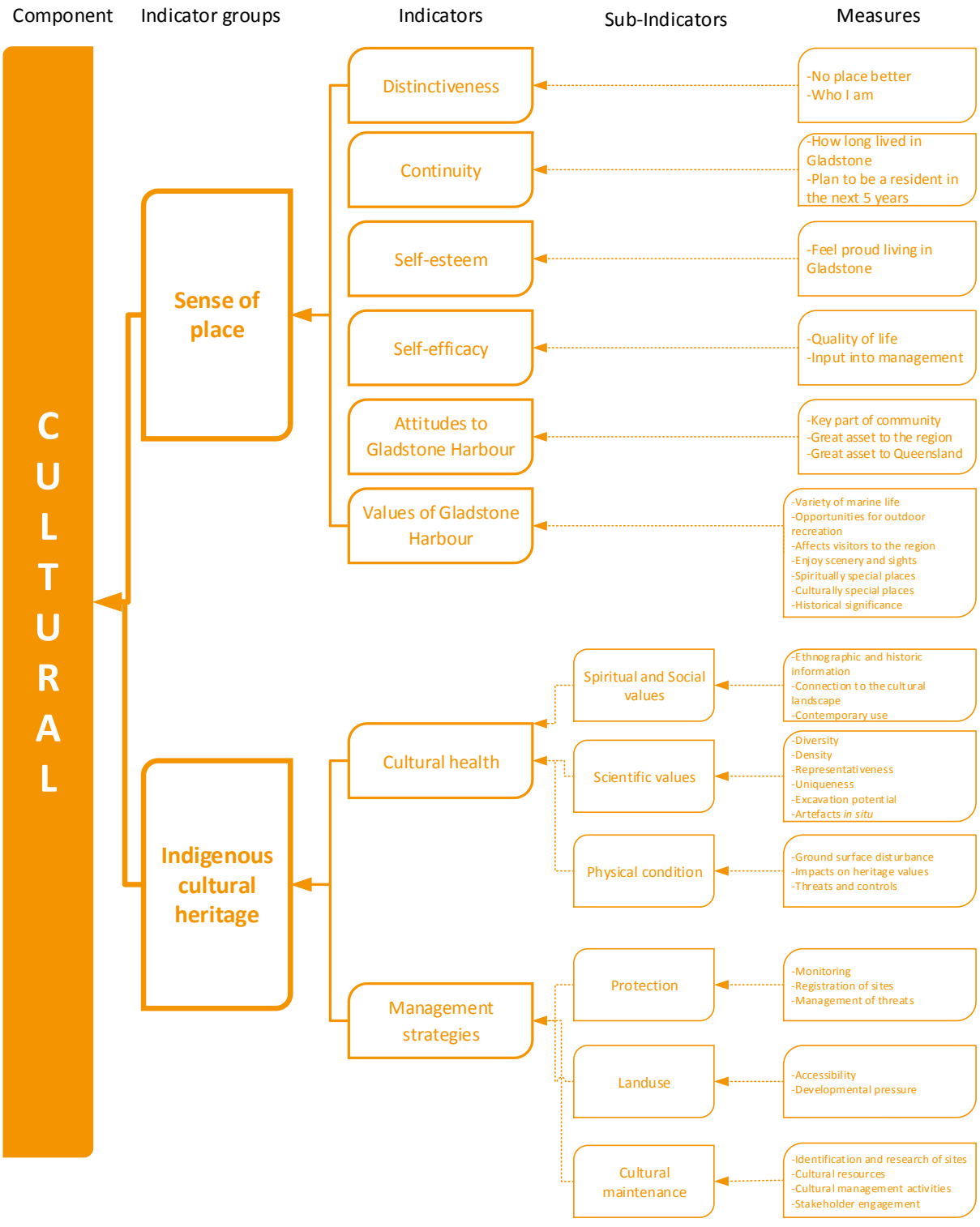
Appendix A. Assessment criteria: indicators and aggregation levels




Component
Indicator groups
Indicators
Measures
ECONOMIC
Economic performance
Economic stimulus
Economic value (Recreation)
Shipping activity
Tourism
Commercial fishing
Employment
Socio-economic status
Land based recreation
Recreational fishing
Beach recreation
Shipping activity productivity calculated from monthly shipping movements by cargo type
Expenditure on hotel accommodation and food
-Productivity of line fisheries
-Productivity of net Fisheries
-Productivity of trawl fisheries
-Productivity of pot fisheries
Unemployment statistics for the Gladstone Local Government Area
Index of economic resources derived from 2011 census and updated using CATI survey data
Land based recreation satisfaction +economic value
Recreational fishing satisfaction + economic value
Beach recreation satisfaction + economic value


Component
Indicator groups
Indicators
Sub-Indicators
Measures
CULTURAL
Sense of place
Indigenous cultural heritage
Distinctiveness
Continuity
Self-esteem
Self-efficacy
Attitudes to Gladstone Harbour
Values of Gladstone Harbour
Cultural health
Management strategies
Spiritual and Social values
Scientific values
Physical condition
Protection
Landuse
Cultural maintenance
-No place better
-Who I am
-How long lived in Gladstone
-Plan to be a resident in the next 5 years
-Feel proud living in Gladstone
-Quality of life
-Input into management
-Key part of community
-Great asset to the region
-Great asset to Queensland
-Variety of marine life
-Opportunities for outdoor recreation
-Affects visitors to the region
-Enjoy scenery and sights
-Spiritually special places
-Culturally special places
-Historical significance
-Ethnographic and historic information
-Connection to the cultural landscape
-Contemporary use
-Diversity
-Density
-Representativeness
-Uniqueness
-Excavation potential
-Artefacts in situ
-Ground surface disturbance
-Impacts on heritage values
-Threats and controls
-Monitoring
-Registration of sites
-Management of threats
-Accessibility
-Developmental pressure
-Identification and research of sites
-Cultural resources
-Cultural management activities
-Stakeholder engagement

Appendix B. Questionnaire 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?

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

Possible age and gender screening questions here? -tba

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 three different types of recreational activity. The first relates to your use of beaches, the second to other shore-based activity and the third to recreational fishing (both from land and from a boat).

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
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

We would now like you to think about any recreational fishing activity 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

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 satisfied
1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

We would now like you to think about any **other 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 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.

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

Q12B1: Thinking of the last **other 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
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q16. Thinking back to the **last time** you went ~~fishing~~ **on a water-based recreation trip** 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	Yes/No
If you did other things as well, approximately what proportion of your time was spent doing the recreational activity *Do not include travel time*	% of time

Q22. Did your activity involve the use of a boat or jet ski_____ Yes/ No

If yes, Which? Q22a = boat; Q22b = jet-ski; Q22O – other

Q23. Approximately how many kms or nautical miles did you travel on the water?

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 Disagree									Strongly Agree	No
	1	2	3	4	5	6	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											

	Strongly Disagree									Strongly Agree	No
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
	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											
Q45. Gladstone Harbour makes living in Gladstone a better experience											

With 1=strongly disagree to 10=strongly agree	Strongly									Strongly	No
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
	1	2	3	4	5	6	7	8	9	10	
Q47. I feel able to have input into the management of the Gladstone Harbour if I choose to											

With 1=strongly disagree to 10=strongly agree	Strongly									Strongly	No
	1	2	3	4	5	6	7	8	9	10	
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									Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
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+
☐	☐	☐	☐	☐	☐

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)?

Weekly	**≤$399**	**$400 - $799**	**$800 - $1249**	**$1250 - $1499**	**$1500 - $1999**	**$2000 - $2999**	**≥$3000**
Annual	**≤$20,799**	**$20,800 - $41,599**	**$41,600 - $64,999**	**$65,000 - $77,999**	**$78,000- $103,999**	**$104,000 - $155,999**	**≥$156,000**
	☐	☐	☐	☐	☐	☐	☐

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?
☐	☐	☐

Q73a. I*f owned with a mortgage*, is your mortgage repayment greater than $3000/month

Yes ☐ No ☐

Q73b. *If rented*, is your rent payment greater than $175/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.

In each case sensitivity testing (Independent Samples T-Test at the 5% level) was conducted to determine the relative influence of four factors:

- The length of time respondents have lived in the region (dummy coded for 20 years or longer): the average was 24 years and 52% had lived in the area for 20 years or longer.
- Boat ownership as these respondents have more access to the harbour waters: 36% owned a boat. However, boat ownership is also correlated with gender and males are more likely to own a boat than females [57% vs 43%].
- Gender (dummy coded): 50% males; 50% females.
- Age, with two separate categories created and dummy coded for those under 35years (19%) and those 55 years plus (35%). There were insufficient responses (n=16) to test the sensitivity of the youngest age group (18-24 years) as a separate factor.

Apart from age, the same factors were examined in 2016, but there was little overlap with the influences identified in the results below. The only commonality is that males have lower satisfaction ratings for all three recreational activities (Harbour usability: Q11b, Q15b, Q25) and boat owners are less satisfied with the level of access to public space in the harbour area (Harbour access: Q26).

C1.1 Harbour usability

Harbour usability was assessed across three indicators; Satisfaction with harbour recreational activities (CATI questions 11b, 15b, 25, 28 and 28a), Perceptions of air and water quality (CATI questions 40, 41 and 42), and Perceptions of harbour safety (CATI 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 8.11, 8.31 and 6.99 for beach, other land-based and fishing recreation respectively (Figure C1.1). There was no statistically significant change from last year and none of the sensitivity factors were significant apart from Gender. **Females** had a significantly **higher** mean satisfaction ratings than males for all three activities with mean scores of 8.32 vs 7.89 (p=0.020); 8.54 vs 8.08 (p=0.002) and 7.48 vs 6.74 (p=0.042) for beach, land and fishing recreation respectively.

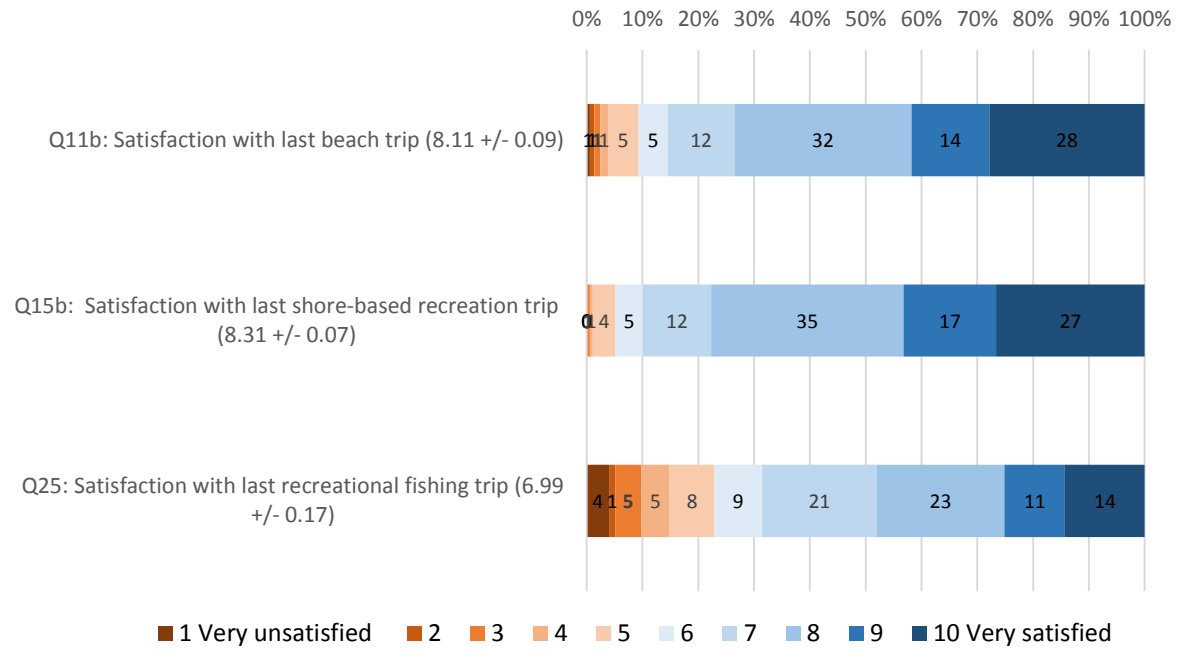


Figure C1.1: Satisfaction with last beach, shore-based, and recreational fishing trip

Satisfaction with the quality of boat ramps in the harbour area was high (mean 7.59, SE 0.11) while satisfaction with the facilities offered at the boat ramps was slightly lower but still high (mean 7.27, SE 0.11), see Figure C1.2. There was no significant influence of any of the sensitivity factors.

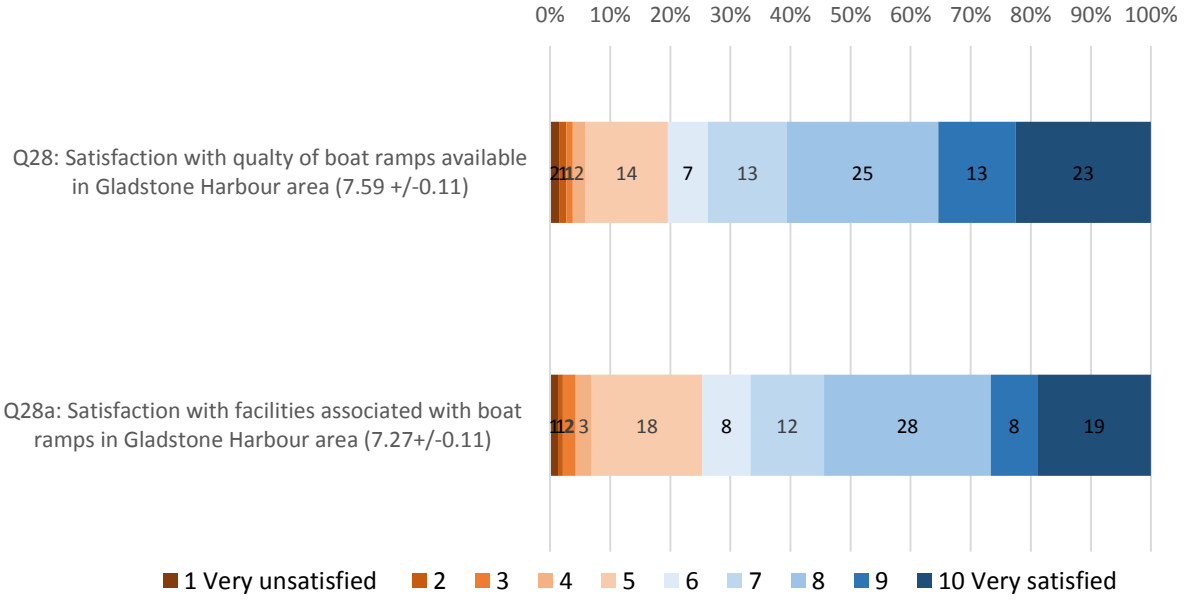


Figure C1.2: Satisfaction with the quality of boat ramps and the facilities

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 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 6.97, SE 0.14), overall agreement that water quality is in good condition was moderate (mean 6.22, SE 0.12). Opinions of air quality were comparatively low (mean 5.13, SE 0.13). Distribution of responses across the three measures are presented in Figure C1.3.

Ratings of air/water quality and water quality on use of the harbour were influenced by:

- Respondents who had **lived in the region for 20 years** or more had **higher** mean scores for perceptions about **water and air quality**: 6.48 vs 5.94 (p=0.029) and 5.46 vs 4.78 (p=0.01) respectively.
- Respondents who **owned a boat** had **lower** mean scores for **air quality**: 4.68 vs 5.39 (p=0.01).
- M**ales** had a higher mean score for **water quality** and agreement that water quality had **not affected their use** of the harbour: 6.52 vs 5.91 (p=0.014) and 7.31 vs 6.63 (p=0.017) respectively.
- **Older** respondents (55yrs+) had a **higher** mean score for air quality: 5.55 vs 4.91 (p=0.026).

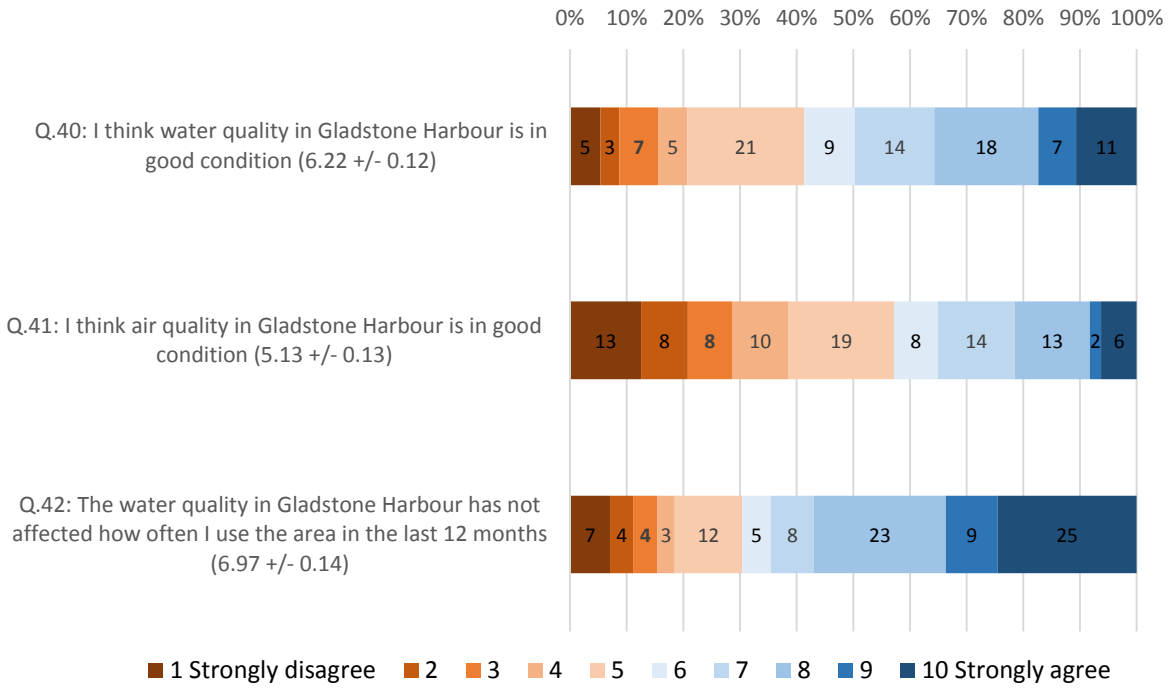


Figure C1.3: Opinions of air and water quality and the effect on usage

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 presented in Figure C1.4.

Perceptions of harbour safety were influenced by:

- Respondents who had **lived in the region for 20 years** or more, **males,** and those who **owed a boat**, all had **higher** mean scores for perceptions about **food safety** (Q43): 7.30 vs 6.69 (p=0.040), 7.32 vs 6.70 (p=0.036), 7.58 vs 6.69 (p=0.002) respectively.
- **Males** were also more likely to have **higher** mean scores for their perceptions about personal safety (Q44): 7.70 vs 6.19 (p=0.000).

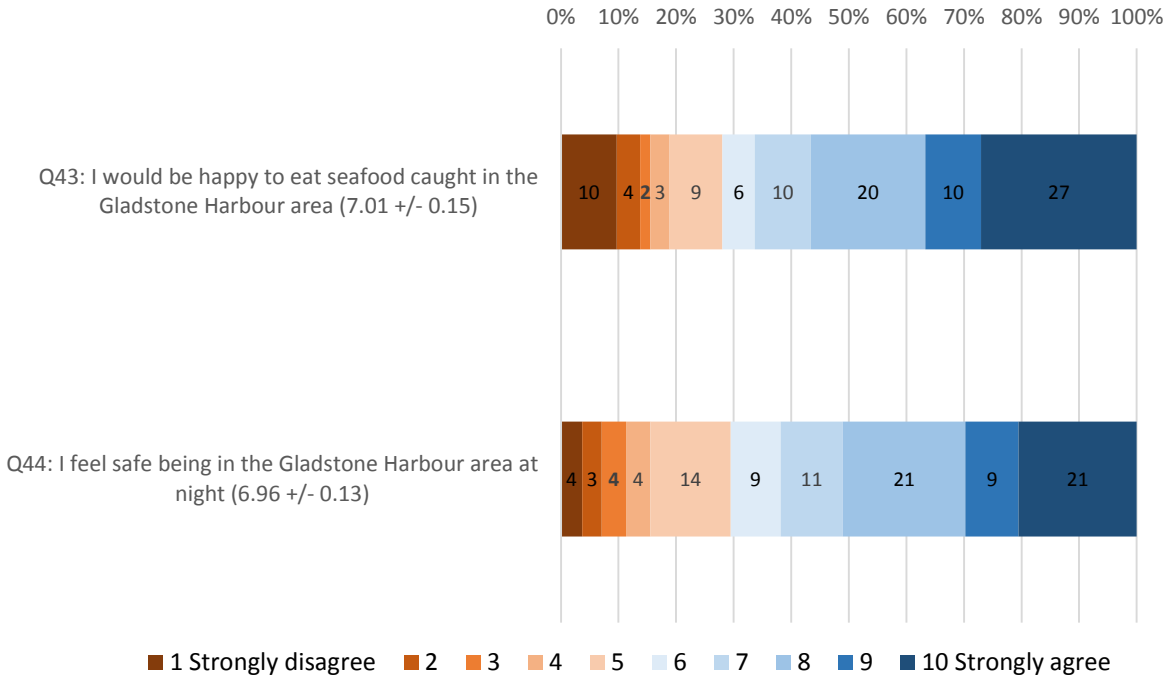


Figure C1.4: Endorsement of feeling safe and eating seafood caught in the Gladstone Harbour area

C1.2 Harbour access

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

C1.2.1 Satisfaction with access to the harbour

As can be seen in Figure C1.5, respondents indicated high levels of agreement with the statement 'I have fair access to Gladstone Harbour' (mean 7.81, SE 0.11). None of the sensitivity factors had any influence on mean scores.

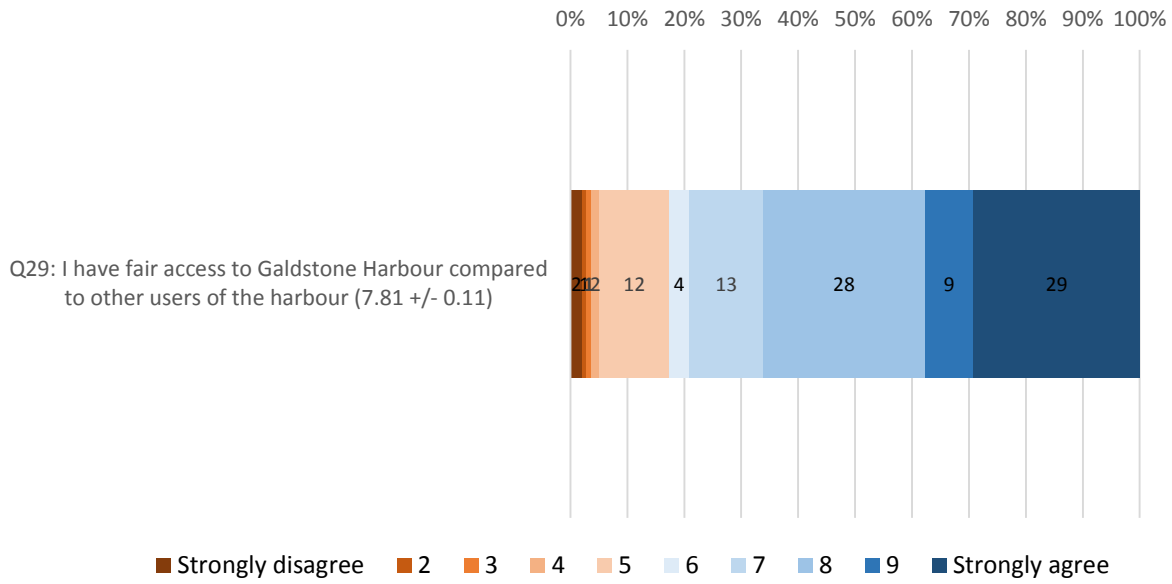


Figure C1.5: Perceptions of fair access to Gladstone Harbour

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 (58%), but the average use by the 42% who had used the ramps was 18.5 times a year. Across the full sample, the average use was eight times per year. (The same category averages were applied as presented in Appendix D: Table D1 in the recreational activity results section).

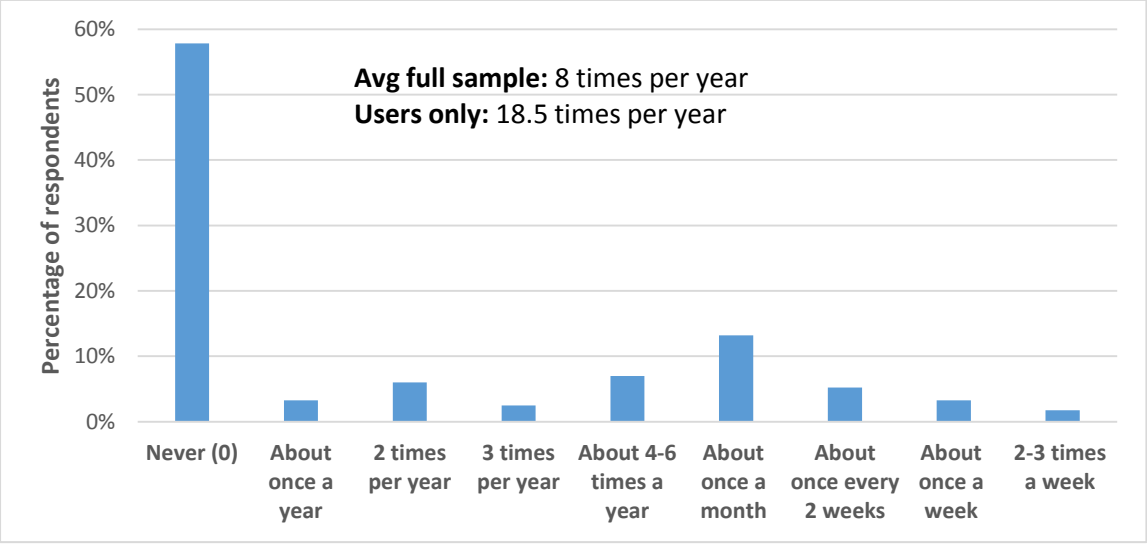


Figure C1.6: Frequency of boat ramp use in the past 12 months

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 for both measures was high with most respondents falling in the 'agree' to 'strongly agree' categories (Figure C1.7). The only significant influencing factor was boat ownership, with **boat owners** being **less satisfied** with

the level of **access to public spaces** around the harbour (Q26) with a mean score of 7.50 vs 8.05 (p=0.020).

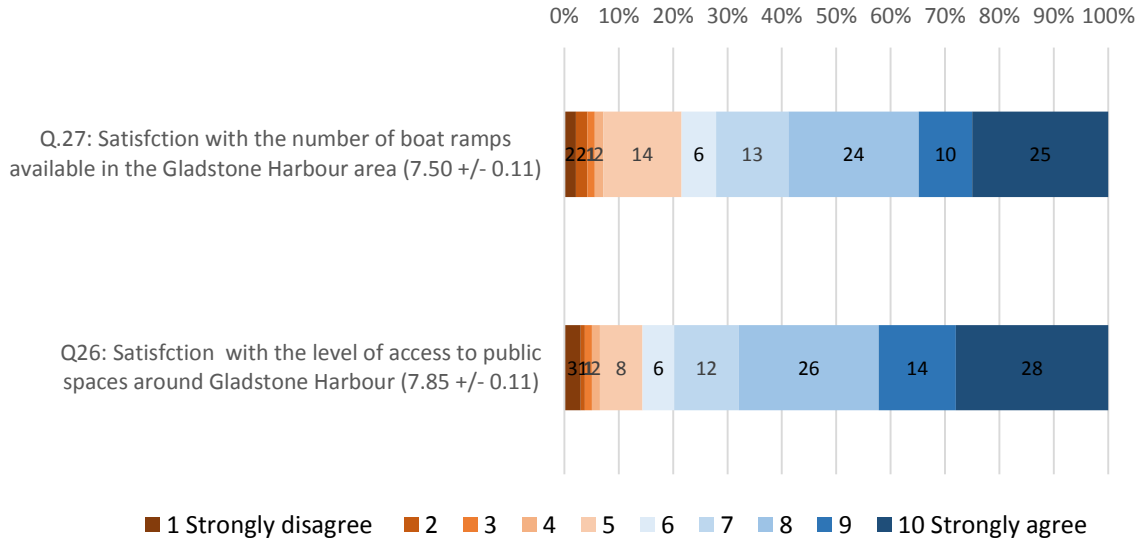


Figure C1.7: Satisfaction with number of ramps and access to public spaces

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. Respondents indicated overall impressions of the Gladstone Harbour area condition (mean 7.18, SE 0.12), their level of optimism for the future health of the harbour (mean 6.65, SE 0.13) and whether they thought the health of the harbour had improved over the past 12 months (mean 6.49, 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. Note that 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.

The only significant influence on opinions was in relation to question 33. Respondents in the **youngest age group** (under 35 years) had a **higher** opinion about the **condition of the harbour** with means scores of 7.62 vs 7.07 (p=0.042).

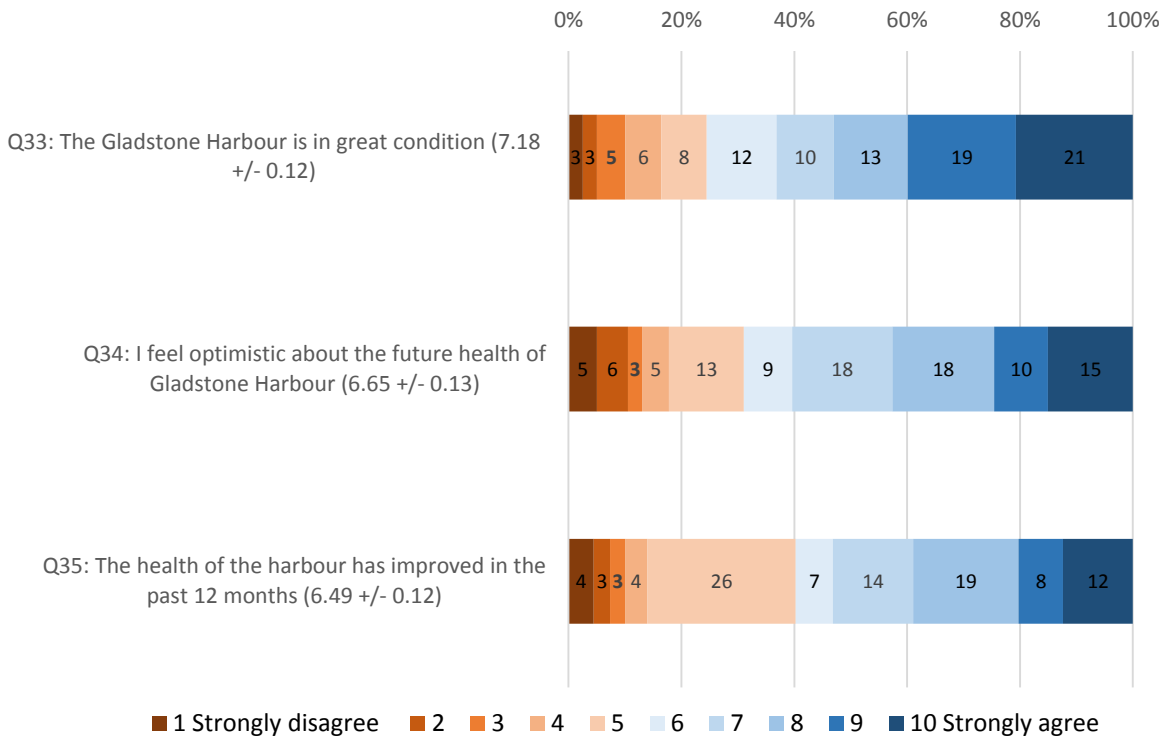


Figure C1.8: Perceptions of harbour condition, future health and improvements over last 12 months

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 measures. There is a more even distribution of responses in relation to the problem of marine debris, with no overall agreement.

The only influencing factor for this indicator was age. Respondents in **the oldest age group** (55 years plus) had higher scores for the impact of shipping on their use of the area (Q31) and were less likely to disagree that shipping had reduced their use: 3.92 vs 3.00 (p=0.001). In other words, **shipping was more of a problem** for them.

In contrast, respondents in the **youngest age group** (under 35 years) had lower scores for the impact of shipping on their use of the area (Q31) and were more likely to disagree that shipping had reduced their use: 2.81 vs 3.44 (p=0.030). **Shipping was less of a problem** for them. **Recreational boating was also less of a problem** for this age group with lower mean scores for question 32 at 3.13 vs 3.78 (p=0.046).

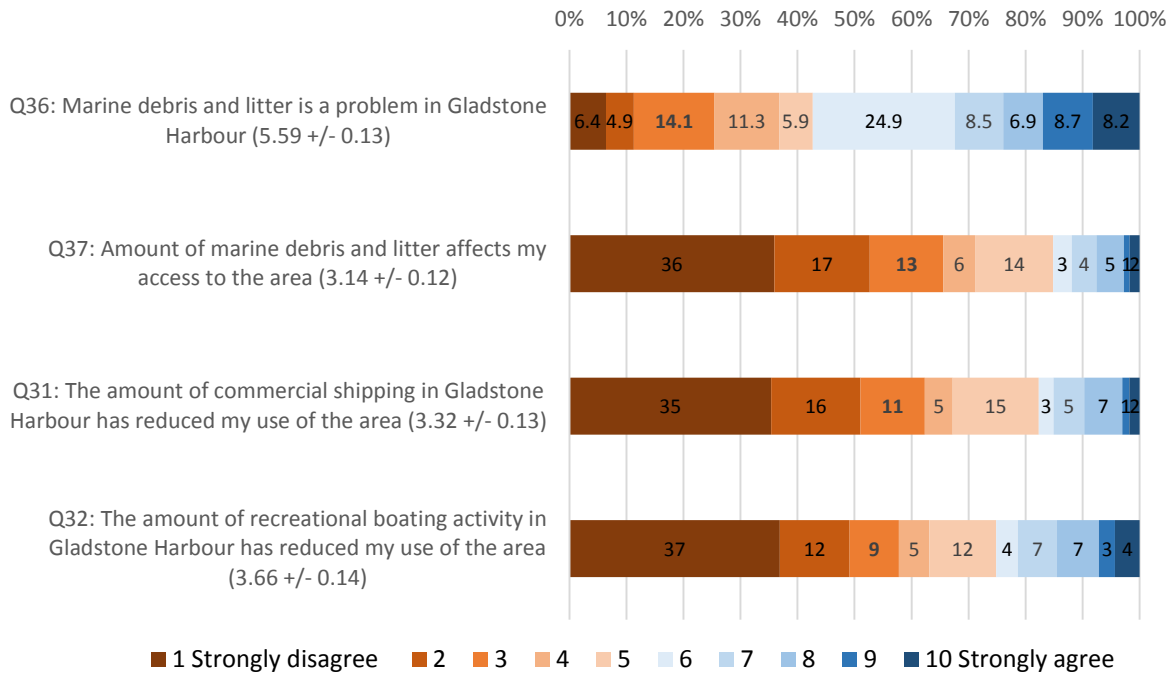


Figure C1.9: Opinions regarding marine debris, levels of shipping and recreational boating

C1.3 Liveability and wellbeing

Liveability and wellbeing was assessed through one indictor (Contribution of harbour to liveability and wellbeing) and two measures (CATI questions 45 and 46). 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 CATI question 46 'I rarely participate in community events in the Gladstone Harbour area' was re-coded so that ratings could be compared across the two measures in this indicator. Figure C1.10 presents the overall pattern of responses to these measures. Note that the wording of question 46 has been presented as 'I regularly participate in community events in the Gladstone Harbour area' to reflect the recoding. For both measures a higher number indicates greater engagement with, and appreciation of, the 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 (mean 8.05, SE 0.10) but there was no clear trend towards participation in community events (mean 5.95, se 0.15).

There were no sensitivity factors influencing opinions about Gladstone's liveability (Q45) but **males** and the **oldest respondents** (55 yrs +) were **less likely** to participate in community events: means scores of 5.57 vs 6.33 (p=0.012) and 5.11 vs 6.41 (p=0.000) respectively.

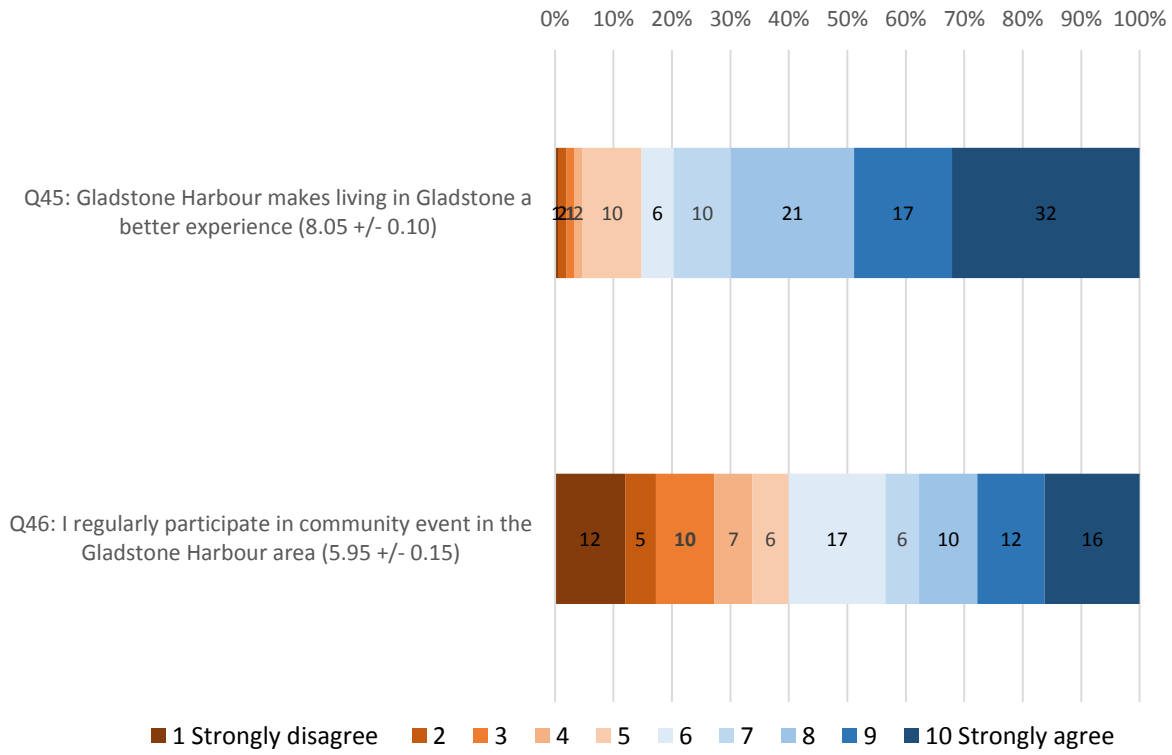


Figure C1.10: Liveability and participation in community events

C2 Cultural component: 'Sense of place' indicator group

Only one indictor 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 the relative influence of five factors. The same four factors tested in the social component were repeated as well as an additional factor relating to respondents who identified as being a Traditional Owner of the area.

Apart from Indigeneity, gender and long term residence were the most frequently recorded factors of significance (6 out of 17 measures), with boat ownership significant for three measures and the two age groups for one measure each.

The sample included 54 respondents (13.5%) 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 is a similar proportion to that recorded in previous years. There was a significant difference in the responses of Traditional Owners to ten of the 17 questions. Six of these related to the Values indicator and covered all but one measure (the importance of outdoor recreation) for the indicator. The other differences related to the Distinctiveness, Continuity and Self-esteem indicators. Full details are outlined in each section below.

The pattern of significant influence associated with gender and Indigeneity was similar to that recorded in 2016.

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.

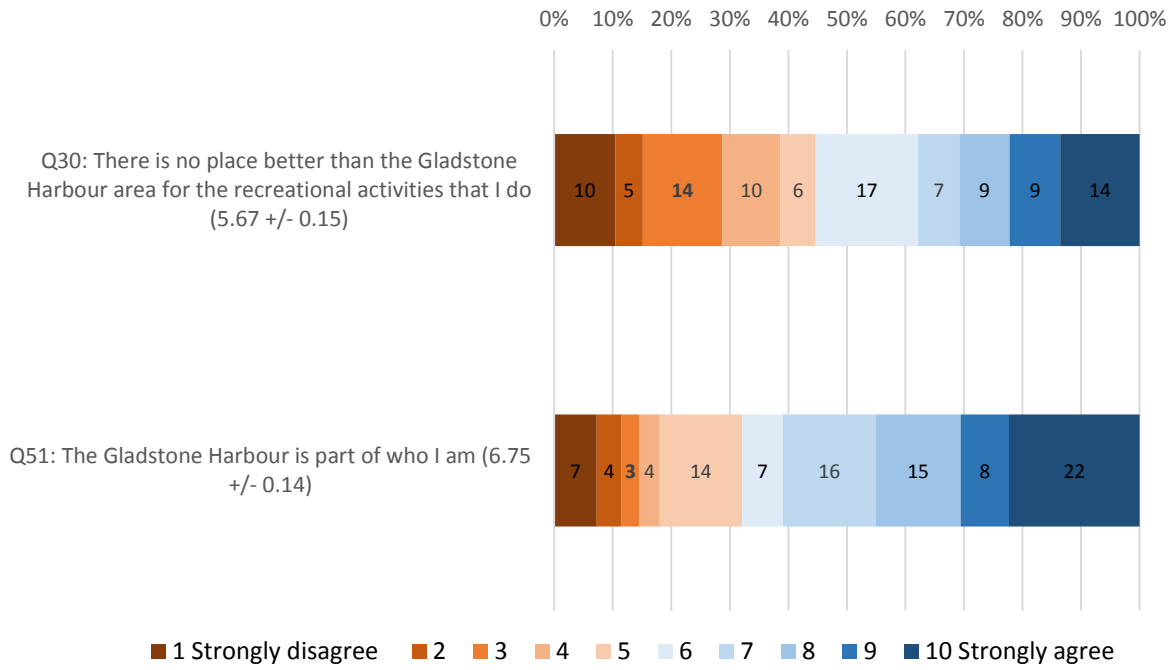


Figure C2.1: Measures of distinctiveness

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. Two sensitivity factors were significant. Respondents who had lived in the region **for 20 years or longer** were **more likely to agree** that there was '**no better place** ' with higher mean scores (5.96 vs 5.34; p=0.035) and that the harbour is '**part of who they are'** (means scores of 7.36 vs 6.09; p=0.000).

Individuals who identified as **Traditional Owners** agreed that the harbour is '**part of who they are'** significantly **more strongly** than those who did not so identify (7.92 vs 6.58, p=0.000).

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 1 month) through to 79 years (average 24 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 fell in the <1 to 9 years and 10-19 year cohorts.

The three significant factors in the sample were gender (males) and boat ownership (which were correlated as males were more likely to own a boat than females [57% vs 43%]) and Indigeneity with all having than higher average means of:

- Males: 26.07 vs 21.80 years
- Boat owners 26.59 vs 22.47 years
- Traditional Owners: 30.94 vs 22.85 years

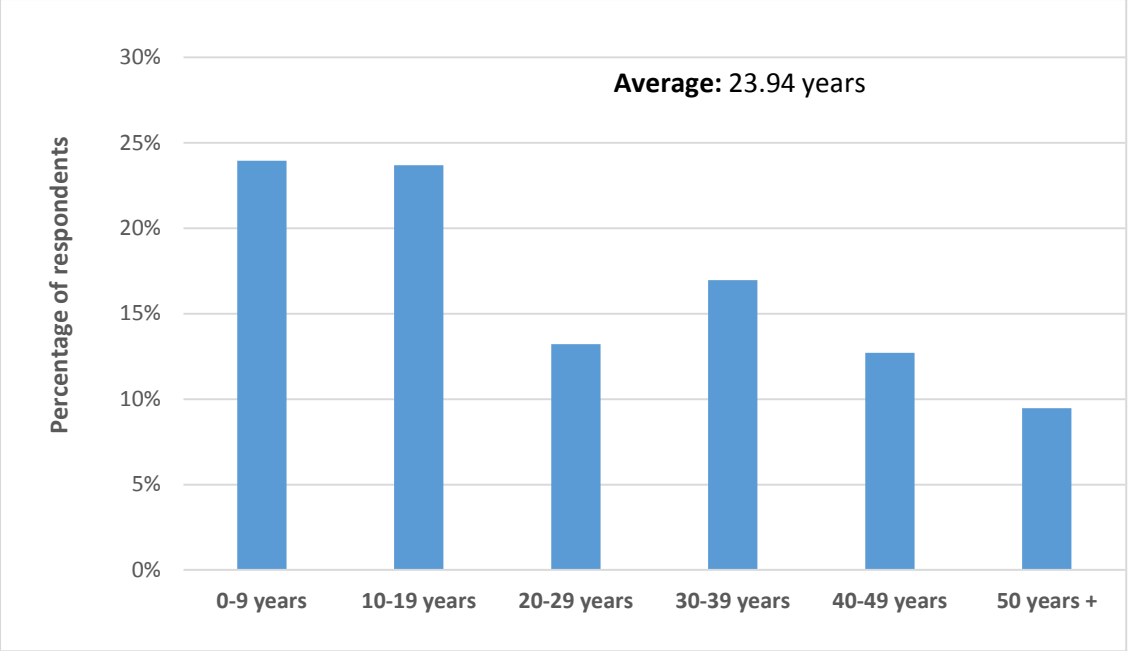


Figure C2.2: Time spent living in the Gladstone Harbour area

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 these questions. 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.

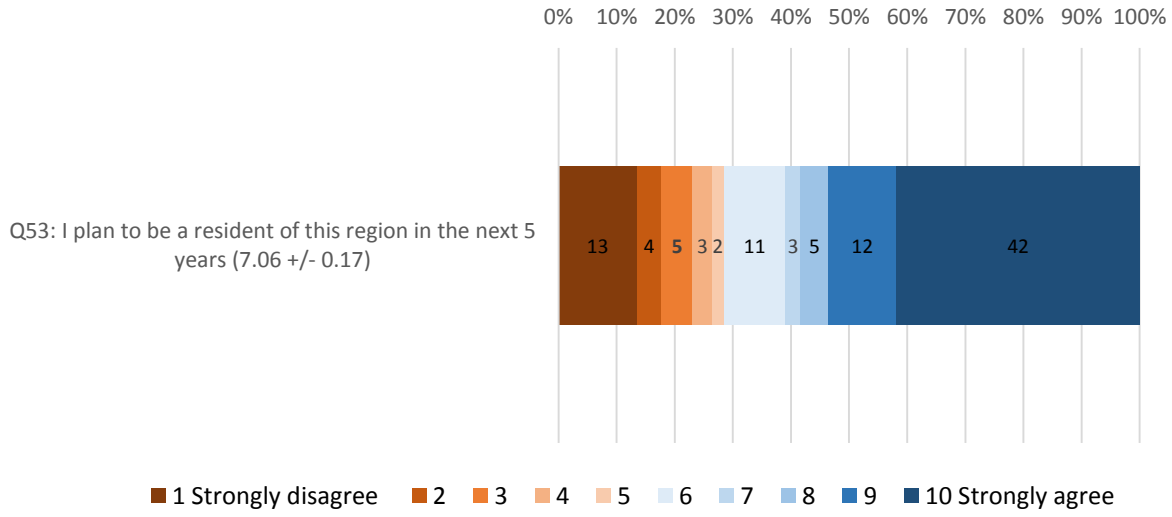


Figure C2.3: Intention to remain in the Gladstone Harbour area for the next 5 years

Intention to remain in the Gladstone Harbour area in the immediate future was not dependent on any of the sensitivity factors.

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 7.78; SE 0.11).

The only significant influencing factor was Indigeneity with **Traditional Owners** having a **higher** level of agreement (mean 8.54 vs 7.66; p=0.006).

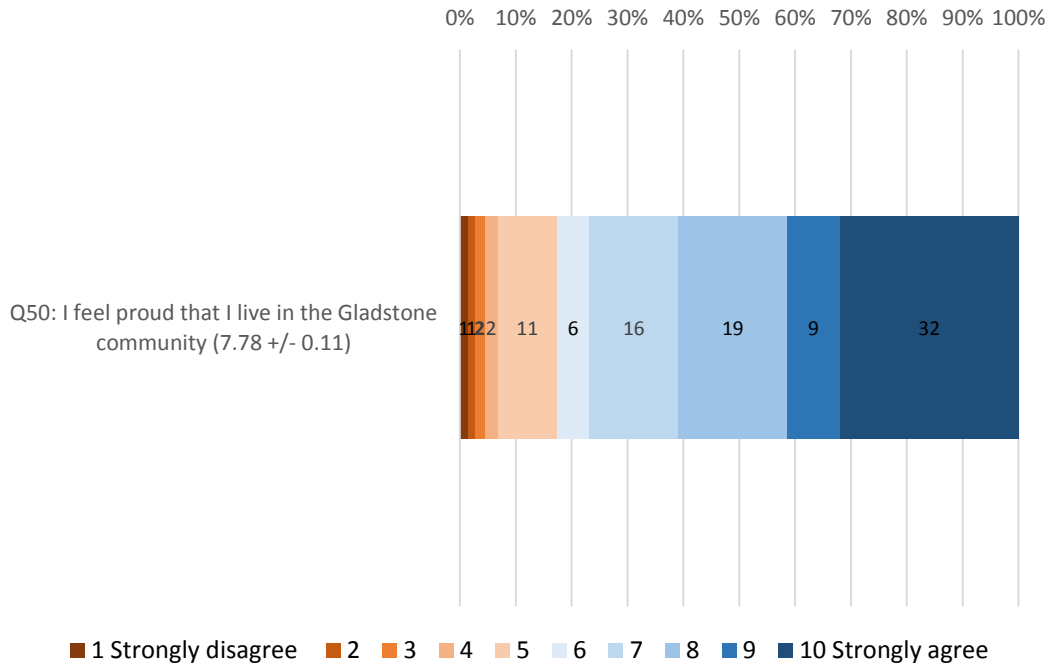


Figure C2.4: Measure of Self-esteem

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 7.22 highlighting the positive effect of the area on respondent quality of life. The only significant influence was **boat ownership** with a mean score of 7.57 vs 7.03 (p=0.036).

It is apparent that 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). The only significant influence was Indigeneity with **Traditional Owners** having a **higher** level of agreement (mean 6.23 vs 5.35; p=0.043).

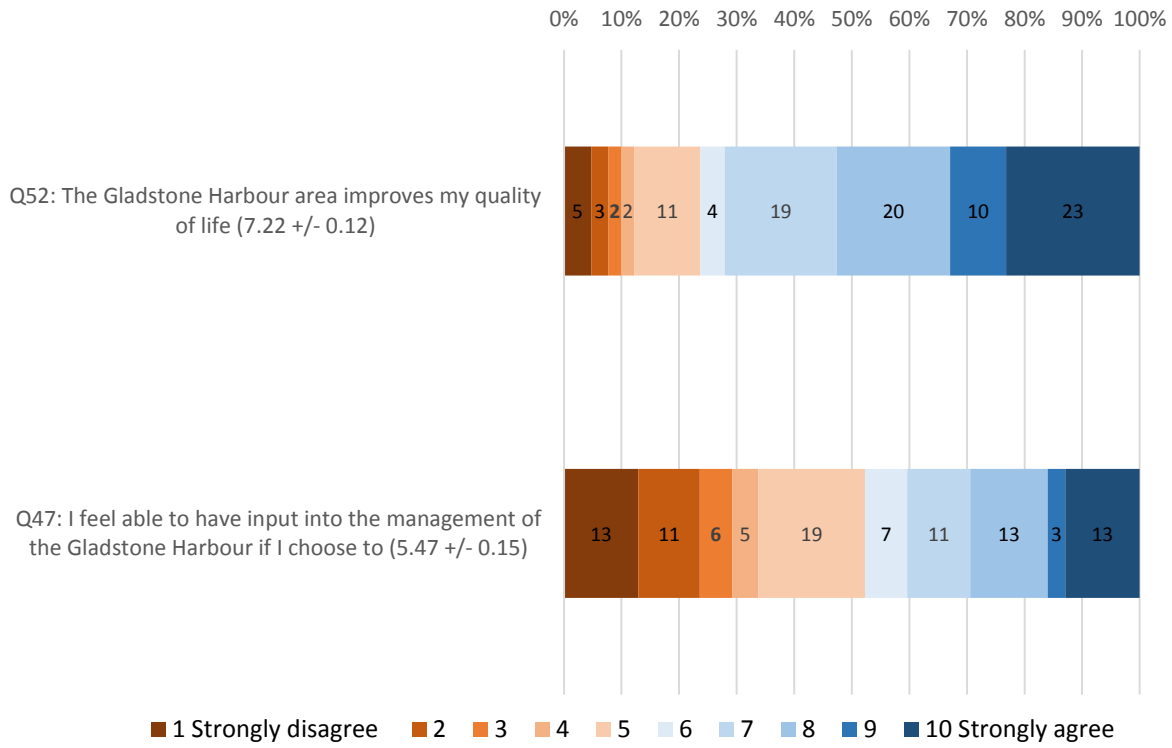


Figure C2.5: Measures of Self-efficacy

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 8.76), that it is a great asset to the local regional economy (8.73) and a great asset to the State economy (8.65).

Only one of the measures (Q59: great asset to the State economy) was influenced by any of the sensitivity factors.

- People who had lived in the region **for 20 years** or longer and people aged **55 years plus** had **higher** average means scores: 8.88 vs 8.40 (p=0.005) and 8.89 vs 8.52 (p=0.036) respectively.
- People **under 35 years** of age had a **lower** average mean score: 8.18 vs 8.76 (p=0.007).

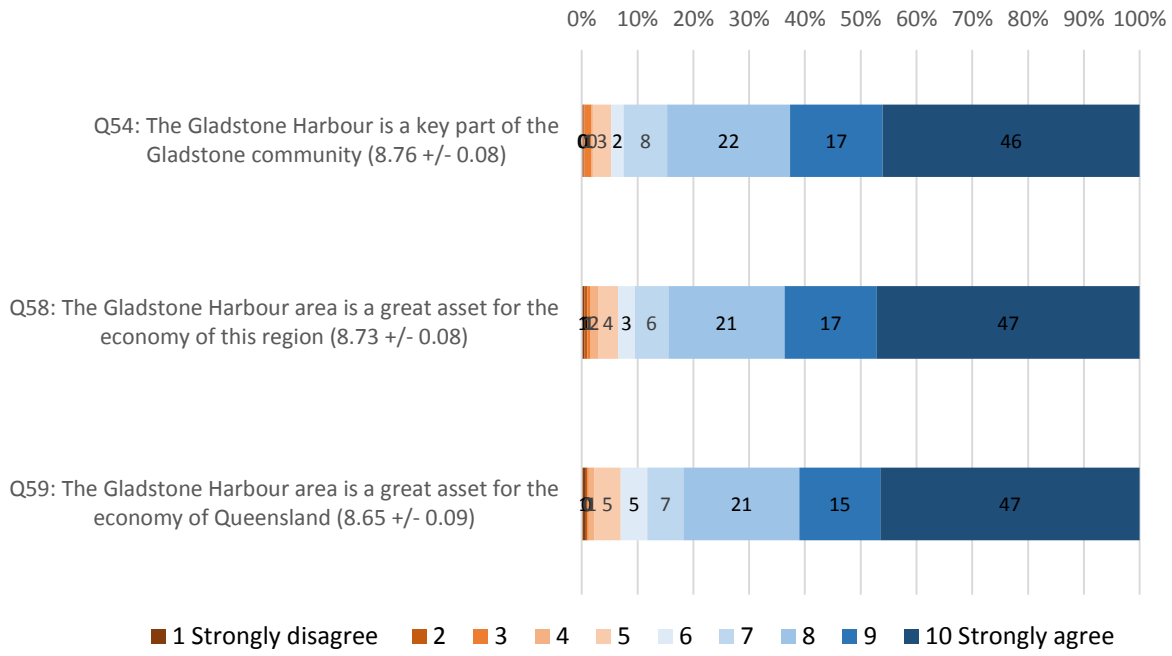


Figure C2.6: Measures of Attitudes to Gladstone Harbour

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 7.67]; opportunities for outdoor recreation [mean 8.37]; attracts visitors to the region [7.77]; scenery and sights [8.24]) 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 [5.60]; culturally special places [5.71] and historical significance [5.88]).

Gender effects were observed across most of the value statements with fe**males** indicating a **higher** level of agreement with the value of:

- Q57 'attracting visitors to the region' (8.20 vs 7.35, p=0.000)
- Q60 'scenery and sights' (8.48 vs 7.99, p=0.009)
- Q61 'spiritually special places' (6.14 vs 5.04, p=0.000)
- Q62 'culturally special places' (6.23 vs 5.20, p=0.000)
- Q63 'historical significance' (6.30 vs 5.46, p=0.004)

Similarly, significant differences were noted, for Q63 '**historical significance'** as a function of length of residence (**20 years plus**) with **higher** than average mean scores (6.27 vs 5.46, p=0.005) and for age (**35 years and under**) with **lower** than average scores (5.23 vs 6.04, p=0.029).

Boat ownership was a significant influence for Q57 'attracting visitors to the region' with **lower** than average scores (7.44 vs 7.95, p=0.028).

Those who identified as a **Traditional Owner** of the area showed significantly **higher** endorsement of the measures presenting the personal value of:

- Q55 'variety of marine life' (8.26 vs 7.58, p=0.022)

- Q57 'attracting visitors to the region' (8.50 vs 7.66, p=0.003)
- Q60 'scenery and sights' (8.93 vs 8.13, p=0.004)
- Q61 'spiritually special places' (7.36 vs 5.32, p=0.000)
- Q62 'culturally special places' (7.33 vs 5.47, p=0.000)
- Q63 'historical significance' (7.07 vs 5.70, p=0.001)

While there was some overlap in the significant influence of females and Traditional Owners in the different measures for this indicator, the mean scores for Traditional Owners were higher than those of females. In addition, the difference in mean score for Indigenous vs non-indigenous was greater than that for females vs males.

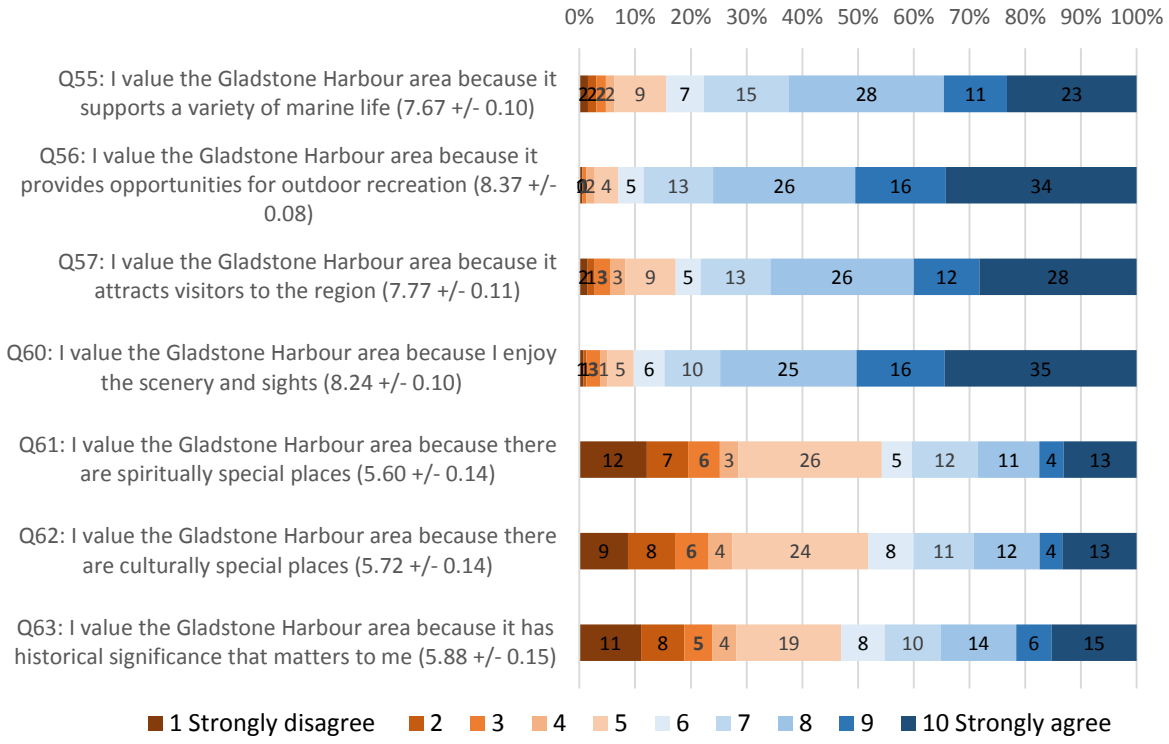


Figure C2.7: Measures of Values of Gladstone Harbour

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. Three types of recreational activity (beach recreation, land-based recreation and recreational fishing) are applied as separate indicators. Updated information about recreational activity and the valuation estimates for the three recreation indicators is presented in the first two sections below.

In 2017, specific information was collected in the community survey to estimate the value of other (non-fishing) water-based recreation in the harbour. The results make it possible to potentially include this as a fourth indicator of recreational activity in the future and provide a more comprehensive estimate of recreational value in the harbour area. Full details are outlined in the third section below.

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

A total of 401 responses were collected in the 2017 CATI survey. Nearly all respondents (96.5%) had visited the Gladstone Harbour area in the last 12 months (an increase of 5% from last year), and 364 (91%) respondents had visited the harbour for recreational purposes (also a 5% increase from last year).

The majority of respondents (64%) indicated that their recreational use of the harbour had not changed in the last 12 months with more people reporting increased use (20% [3% more than 2016]) than decreased use (15% [3% less than 2016]). As occurred in previous years there was a significant influence of age in those who reported a change in recreational activity, and older respondents were less likely to have reported an increase in activity.[10]

More than a third of respondents (36%) indicated they own a boat. In the last 12 months, there had been little change in use of boat ramps.

- 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)
- 2016: 163 (41%) 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)

Land-based and beach recreational activity was much more prevalent than recreational fishing. Over 90% of respondents had participated in land-based (92%) and beach recreation (91%), while 44% had been recreational fishing. In the last year, there has been little change in land and beach recreation, but participation in recreational fishing has increased by 5%. Details of trip frequencies for the different activities are provided in Table D1. There appears to have been a small decrease in the frequency of recreational activity in the harbour for all three activities but these changes are not statistically significant. More people have participated in recreational fishing compared to last year (n=175 vs n=158) but trip frequency rates have declined (15.7 trips/yr vs 19) resulting in an overall decline for the full sample.

[10] Two new age groups were created: 1. = 45 plus years; 2= 55 plus years. There was a significant difference (Pearson Chi-Square crosstab), with those in the 45yr plus and the 55yr plus groups less likely to have reported an increase in their recreation activity at the 5% and 1% level respectively.

Table D1: Recreational activity and frequency of participation

Response category	# trips/year (applied)	Beach recreation		Other land based recreation		Recreational fishing	
		#	%	#	%	#	%
4-7 times a week	225	16	4.0%	23	5.7%	1	0.2%
2-3 times a week	115	25	6.2%	27	6.7%	5	1.2%
About once a week	60	35	8.7%	38	9.5%	9	2.2%
About 1 every 2 wks	30	50	12.5%	59	14.7%	21	5.2%
About once a month	13	86	21.4%	98	24.4%	33	8.2%
About 4-6 times a yr	5	86	21.4%	65	16.2%	42	10.5%
3 times per year	3	27	6.7%	24	6.0%	19	4.7%
2 times per year	2	29	7.2%	24	6.0%	30	7.5%
About once a year	1	12	3.0%	10	2.5%	15	3.7%
Never	*0*	*35*	*8.7%*	*33*	*8.2%*	*226*	*56.4%*
Total		**401**	**100**	**401**	**100**	**401**	**100**
2017 Avg trips per year (users)		**32.17 (n=366)**		**38.20 (n=368)**		**15.66 (n=175)**	
2016 Avg trips per year (users)		34.23 (n=370)		41.33 (n=374)		19.04 (n=158)	
2017 Avg trips per year (full sample)		**29.36 (n=401)**		**35.06 (n=401)**		**6.84 (n=401)**	
2016 Avg trips per year (full sample)		31.58(n=401)		38.55(n=401)		7.50 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.

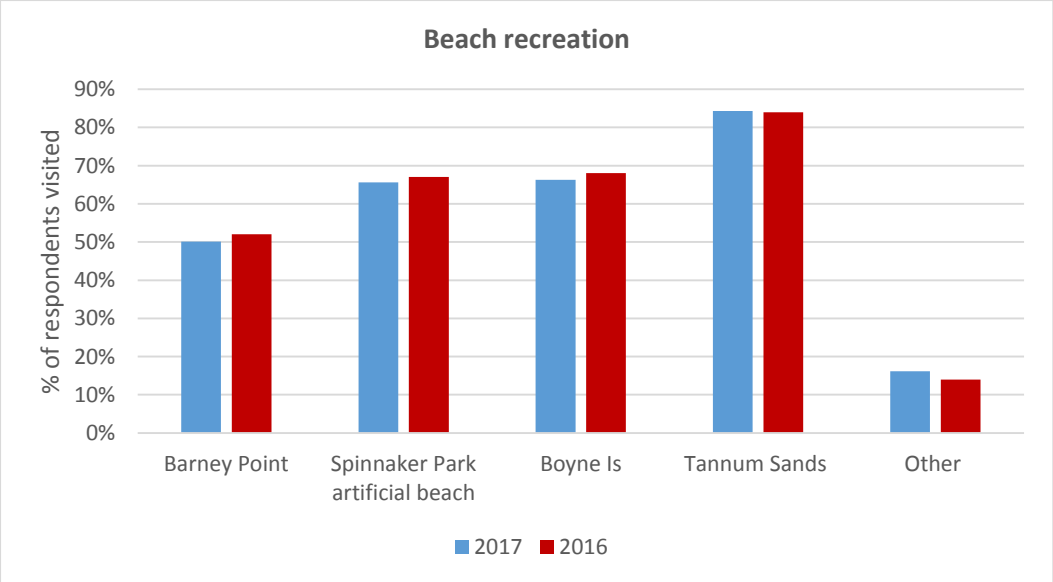


Figure D1.1: The most popular beaches visited by surveyed Gladstone residents

Walking, picnicking and relaxing were the most popular land-based recreational activities with some small changes recorded in all activities compared to the previous year, apart from Community events (Figure D1.2).

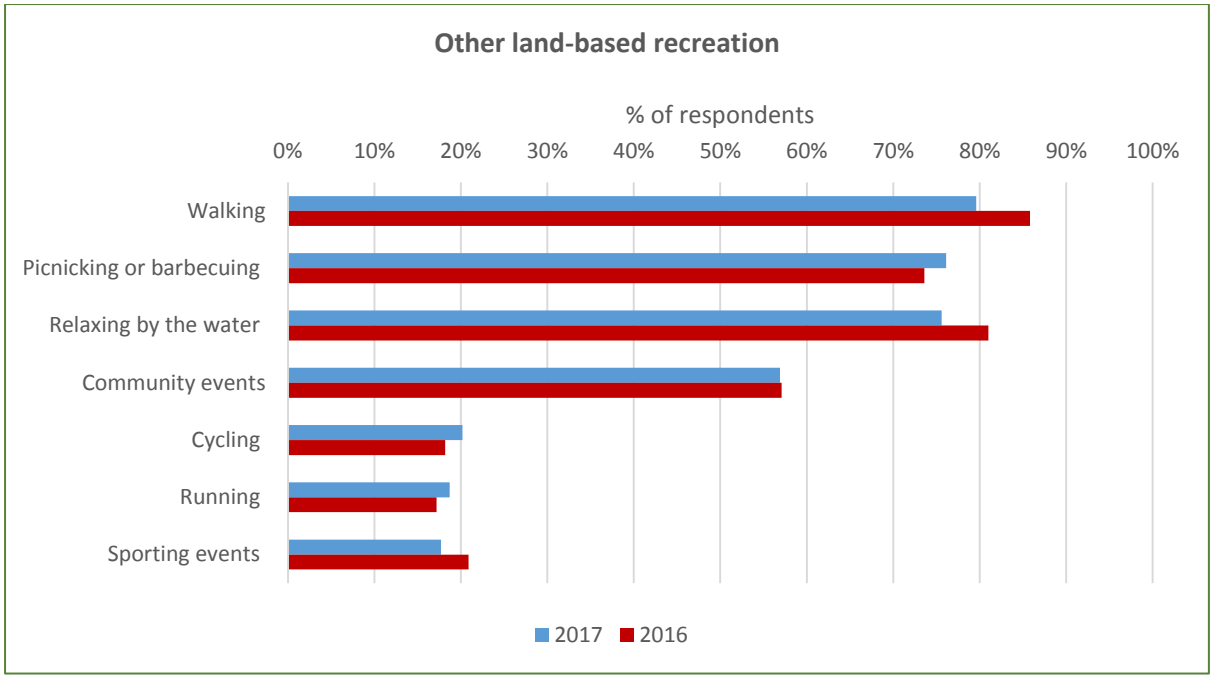


Figure D1.2: Popular land-based activities

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

Respondents were also asked to indicate their level of satisfaction with the three different types of recreational activity (on a scale from 1 = very unsatisfied to 10 = very satisfied). The satisfaction ratings for the three recreational activities, as well as a comparison with 2016 ratings are presented in Figure D1.3.

Overall, respondents reported high levels of satisfaction with a mean scores of 8.11, 8.31 and 6.99 for beach recreation, other land-based recreation and recreational fishing respectively. There was no statistically significant change from 2016 in mean rating scores for any of the activities.

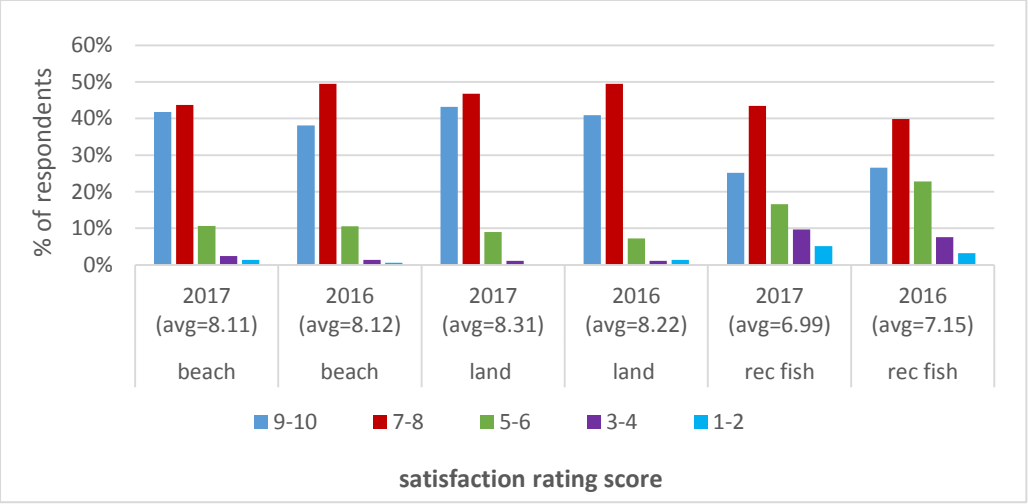


Figure D1.3: Satisfaction ratings for recreational activity

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

The value of a recreational trip for each of the three recreational activities has already been estimated and the total annual value of recreational activity was updated by adjusting activity frequency rates (collected in the 2017 CATI survey) and extrapolating the information to the Gladstone population. Details of the current trip frequency rates are provided in Table D2.

Table D2: Summary of updated recreation value estimates

	Beach recreation	Land-based recreation	Recreational fishing
Household value method			
Trip value (95% confidence intervals [CIs])	$40[1] ($26 - $105)	$61[1] ($48 - $85)	$143[2] ($70-$920)
Full sample: Avg # trips/yr	29.36 *(2016=31.58)*	35.06 *(2016=38.55)*	6.84 *(2016=7.50)*
Annual value per trip *(full sample)*	$1,180 ($763 - $3,083)	$2,154 ($1,683 - $2,980)	$979 ($482-$6,290)
Gladstone: Annual value of recreation trips	*$31 million ($20M - $80M)*	*$56 million ($44M - $77M)*	*$25 million ($12M-$163M)*
Adult value method			
Trip value/ adult (CIs)	$21 ($13 - $46)[1]	$27 ($20 - $42)[1]	$60 ($31-$1,746 [2]
Mean annual value per adult *(full sample)*	$610 ($382 - $1,351)	$942 ($701 - $1,473)	$413 ($210 - $11,940)
Gladstone: Annual value of recreation trips	*$30 million ($18M - $66M)*	*$46million ($34M - $71M)*	*$20 million ($10M-$580M)*
Average value			
2017 Gladstone: Avg Annual value of recreation trips (CIs)	**$30.10 million ($19M - $73M)**	**$50.80 million ($39M - $74M)**	**$22.73 million ($11M - $371M)**
% total economic value	*29%*	*49%*	*22%*
2016 Gladstone: Avg Annual value of recreation trips (CIs)	$31.79 million ($20M - $77M)	$54.75 million ($42M - $80M)	$24.43 million ($12M - $706M)

[1] Estimates from the 2014 report card
[2] Estimates from the 2015 report card

To extrapolate the values from the sample to the population of Gladstone, information was applied from the Queensland Government Statistician's Office (QGSO) and the Australian Bureau of Statistics (ABS) 2016 Census data. 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 25,933 households in Gladstone, based on an average household size of 2.6 persons (ABS 2016 Census) and a population of 67,426 in 2016 (QGSO). 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 48,547 adults in this age group assuming the proportion of adults (18-80) was 72% of the population (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 small decreases in the annual value of recreational activity compared with the previous year associated with a small (but not statistically significant) decrease in participation frequency for all three activities, along with a stable population.

The annual value of recreational trips for 2017 is estimated at $104 million, comprising:

- $30.10 million for beach recreation ($31.79 million in 2016)

- $50.80 million for land-based recreation ($54.75 million in 2016)
- $22.73 million for recreational fishing ($24.43 million in 2016)

D3 Other (non-fishing) water-based recreation

In the 2017 CATI survey 161 (40%) respondents indicated that they had participated in other water-based recreation in the harbour area, which highlights its importance as a specific recreational activity.

- The annual economic value of other water-based recreation was $14.70 million representing 12% of the total annual household recreation value of $127 million.
- Participation frequency was slightly lower than that for recreational fishing but satisfaction ratings were higher and closer to those for beach recreation (Table D3.1).

Table D3.1: Summary of participation rates and satisfaction ratings across recreational activities

	Beach	**Land**	**Fishing**	**Water**
Participation	91% (n=366)	92% (n=368)	44% (n=175)	40% (n=161)
Users trips/yr	32.17	38.20	15.66	14.91
Sample trips/yr	29.36	35.06	6.84	5.98
Satisfaction score	8.11	8.31	6.99	8.09
Trip value (95% CIs)	**$40** ($26 - $105)	**$61** ($48 - $85)	**$143** ($73-$4,137)	**$95** ($44-$435)
Total annual (household) value (95% CIs)	**$31 million** ($20m- $80m)	**$56 million** ($44m- $77m)	**$25 million** ($12m- $163m)	**$15 million** ($7m- $68m)
% contribution of value	24%	44%	20%	12%

D.3.1 Water-based recreation activity details

Before survey respondents were asked to provide specific details about their last water-based recreation trip, they were asked a warm-up question about their participation in water-based recreation. The question was designed to focus their attention on the different types of activity that could be considered water-based recreation. Respondents were clearly directed to not include fishing trips. The results are outlined in Figure D3.1 and indicate that general boat recreation is the most common form of activity followed by non-motorised activities and swimming. In the valuation section, 161 respondents provided detailed information: 97 (60%) people described trips that involved motorised boat and/or jet-ski use, and 64 people (40%) described trips that did not include any motorised vehicle.

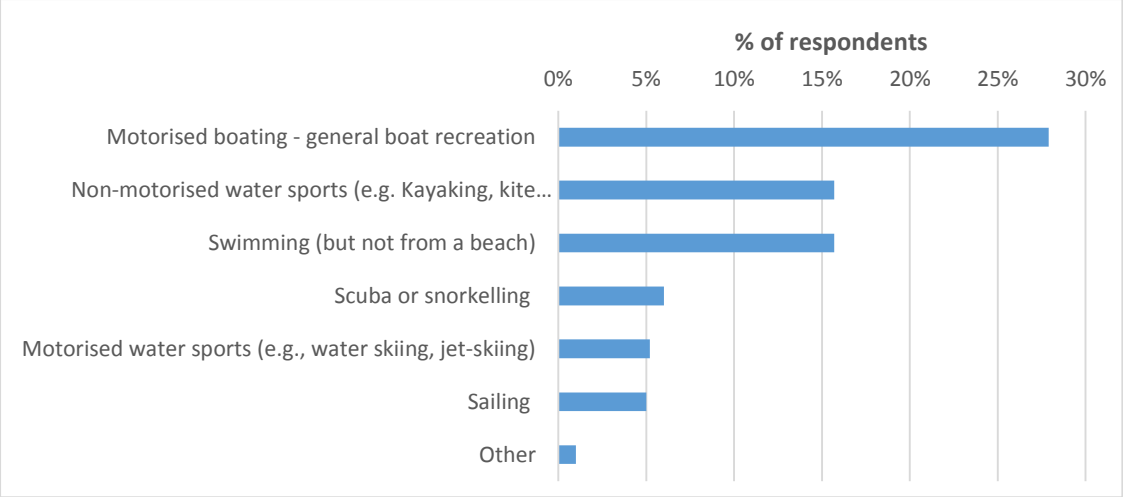


Figure D3.1: Popular water-based recreational activity

Most respondents only participated in water-based recreation a few times a year (Table D3.2) with an average of 14.91 trips per year for users and 5.98 trips per year for the full sample. Sensitivity testing indicated that none of the sensitivity factors (age (under 35yrs, 55 yrs+, 65 yrs+), gender, long term residency (20 years+) or boat ownership had a significant influence on participation frequency (Independent Samples T-test at 5%).

Table D3.2: Participation frequency in other water-based recreation

Response category	**# trips/year (applied)**	**Other water based recreation**	
		#	**%**
4-7 times a week	225	-	-
2-3 times a week	115	3	0.7%
About once a week	60	13	3.2%
About 1 every 2 wks	30	18	4.5%
About once a month	13	32	8.0%
About 4-6 times a yr	5	45	11.2%
3 times per year	3	8	2.0%
2 times per year	2	28	7.0%
About once a year	1	14	3.5%
Users		*161*	*40.1%*
Never	*0*	*240*	*59.9%*
Total		**401**	**100%**

The average distanced travelled on the water was 13 kilometres and the average trip time was 4.4 hours. People involved in water-based recreation had higher than user average participation frequency rates for beach (37.89 vs 32.17) and land-based recreation (47.09 vs 38.02) but lower than the user average for fishing recreation (10.65 vs 15.66).

Satisfaction ratings for water-based activity were similar to those for beach and land recreation, and higher than satisfaction with recreational fishing (Figure D3.2).

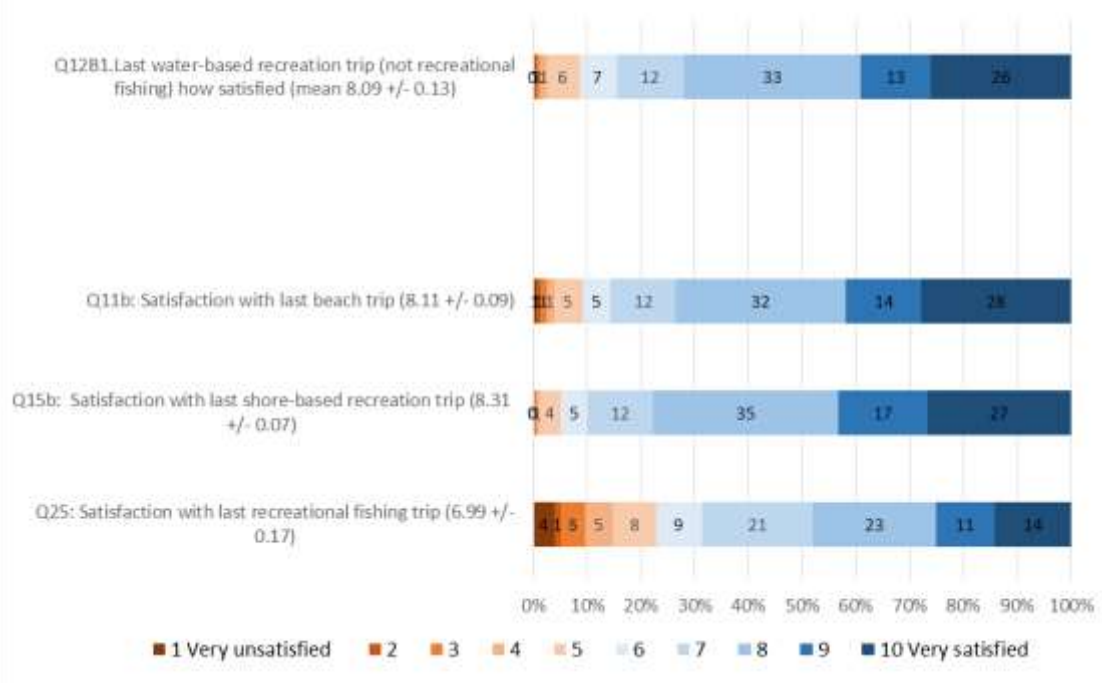


Figure D3.2: Satisfaction rating for water based recreation compared with other activities

D.3.2 Water-based recreation valuation methodology and data calculation details

The same valuation methodology (Travel Cost Method) and data calculation details used to estimate the value of the other three recreational activities, were applied to estimate the value of water-based recreation. 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 model.

To populate a count data model, information is required about both the number of trips and the costs of a trip. Trip frequency details were collected in a categorical format and then adjusted into a non-integer value for analysis. Details are provided in Table D3.2 above with the same rates applied as in previous years. Cost related details were collected for the last water-based trip respondents had made in the last 12 months.

Travel costs were estimated indirectly by using information about travel distance, travel time and the method of travel for each respondent. As in previous years, only three categories of travel mode were specified (walk, bicycle or motor vehicle) and only the latter incurred any transport related cost. However in this valuation, the transport cost for motor vehicles differed from previous years due to changes in the way work-related car expenses are calculated by the Australian Taxation Office. In previous years rates (cost per km) varied according to car size and in the valuation an average value of $0.765 was applied for all motor vehicles. This rate was applied in 2014 and 2015 for beach, land and fishing recreation valuations. The Australian Taxation Office now apply a uniform rate of 66 cents/km for work-related car expenses which was applied in this valuation.

As in previous years:

- 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 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)[11].
- 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.

$$\mathrm{TC}i = \left((\mathrm{distance} * \mathrm{vc}i) + (\mathrm{time} * [12.07 * \#\mathrm{adults}]) + \mathrm{boat\ cost}\right) * Rec\%\mathrm{Trip}$$

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 ; vc_i 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.

Most people do not travel alone and typically in travel cost analysis results are calculated for the group in which the respondent travels (if applicable). The results are generally reported as the value of a trip per group, but can also be apportioned amongst the adults in the group to provide a trip value estimate per adult. Details of both per trip and per adult trip values are provided below.

D.3.3 Water-based recreation valuation estimate

Estimating robust travel cost models (ensuring the travel cost variable is significant) can be difficult especially when there is strong heterogeneity associated with travel costs that are typically apparent with boat use. In these cases much larger sample sizes are required compared to valuations with less cost variation. Consequently, both the CATI (n=401) and the supplementary online survey (n=64) responses were included in the valuation analysis. In total, 186 respondents provided travel details for their water-based recreation. Two were removed from the analysis as one went on a commercial harbour cruise and the other was commuting to work, leaving 184 responses for the analysis (161 CATI and 23 online). The participation frequency and travel cost relationship is illustrated in Figure D3.3. Five cases were identified as potential outliers.

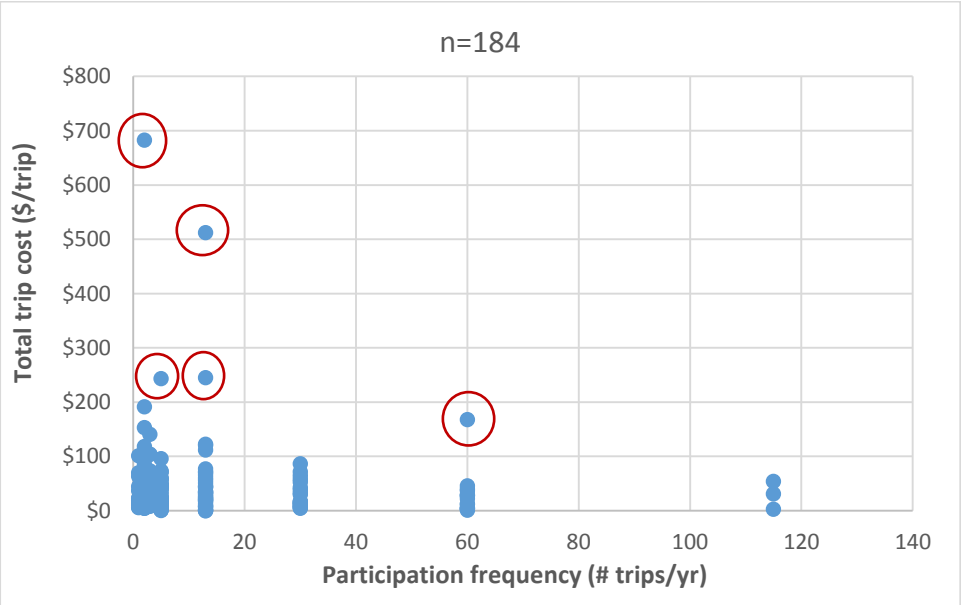


Figure D3.3: Participation frequency and travel cost relationship

[11] Australian Bureau of Statistics 2016. 6306.0 - Employee Earnings and Hours, Australia, May 2016.

The data were analysed using ©LIMDEP statistical software and models were generated using ©NLogit5. It was necessary to remove all five identified outliers to ensure the trip cost variable was significant at the 5% level and the travel cost model is presented in Table D3.3. The model is significant (high Chi square value) and reasonably strong (McFadden R square >0.7). 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).

Table D3.3. Full sample travel cost (zero truncated negative binomial) model

		'Stated' category frequency		
Variable	*Description*	*Coefficient*		*St Err*
Constant		2.5161	***	0.2711
Travel cost	Total cost of trip per group	-0.0105	**	0.0050
Alpha	*Dispersion factor*	3.5554	***	1.3324
Model statistics				
Sample size		179		
Log Likelihood		-621		
AIC/N		6.974		
McFadden Rsrd		0.707		
Chi sqrd		3001		

*** significant at the 1% level; ** significant at the 5% level; significant at the 10% level

The mean economic value (consumer surplus) of a water recreation trip was calculated **as $94.81 per trip** ($-1/\beta_{travel\ cost}$), which compares to the trip value of **$40, $61 and $143** for beach, land and fishing recreation respectively. The 95% confidence intervals (**$43.52 to $435.35)** were estimated from 1000 draws using the Krinsky and Robb (1986)[12] procedure.

On average there were **2.285 adults** per group trip which provides an economic value of **$41.49 per adult/trip.**

To extrapolate the values from the sample to the population of Gladstone, information was applied from the Queensland Government Statistician's Office (QGSO) and the Australian Bureau of Statistics (ABS) 2016 Census data. One assumption was made; the same as in previous years). To extrapolate the total trip value, it was assumed that the information provided by the 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 there were 25,933 households in Gladstone, based on an average household size of 2.6 persons (ABS 2016 Census) and a population of 67,426 in 2016 (QGSO).

The total annual value of other (non-fishing) water-based recreation to the Gladstone economy was estimated as $14.70 million. Details are provided in Table D3.4.

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

Table D3.4: Summary details of the annual value of water recreation in Gladstone

	Water-based recreation
Trip value ($/trip)	$94.81
(95% confidence intervals [CIs])	($43.52 - $435.35)
Full sample: Avg # trips/yr	5.98
Annual value per trip *(full sample)*	$567
	($260 - $2,603)
# households	25,933
Gladstone: Annual value of non-fishing water recreation	**$15 million ($7M - $68M)**

Further exploratory analysis of the data revealed that:

- None of the socio-demographic variables (including age, gender, education, income or length of residency) were significant influences on the dependent variable, trip frequency.
- While it was possible to generate a separate model for non-boat users, it was not possible with just boat users and so the best model remains a combination of boat and non-boat users
- The final model included 22 responses from the online survey, but a robust model could not be developed without them (negative values were generated in the draws for confidence intervals), which emphasises the difficulty in estimating travel cost models with cost heterogeneity and hence the need for larger sample sizes.

Appendix E. Supplementary results: Online community survey

The community survey has been run annually since 2014 with respondents recruited at random and the questionnaire completed in a telephone interview. In the previous years, the demographic profile of the survey sample has matched the Gladstone population in terms of gender and broadly in terms of income. However, the age profile of the sample has always caused concern as it has been overrepresented by older people, and efforts to improve the representation of younger respondents have not proved sufficiently successful. There has also been concern that the use of landlines was becoming an increasingly obsolete method of recruiting respondents as more people only use mobile phones.

Consequently, in 2017 further consideration was given to the method of conducting the community survey. Conducting the survey in an online format was considered preferable but recruitment remained a major issue of concern because there is no readily accessible source to recruit respondents in a random manner. Unfortunately in regional areas of Queensland there is insufficient coverage to access internet panels which can be applied so successfully in the capital cities. A snowballing recruitment method is not considered suitable for a general representative community survey.

Each year at the end of the community survey contact details have been collected from respondents who have agreed to be recontacted and participate in the survey in the future. After three years of surveys (2014-2016), contact details had been collected from 593 respondents and in 2017 a parallel survey (hosted by a private service provider with an established privacy policy) was conducted in addition to the main CATI survey. The results of the online survey have not been included in the analysis for the report card.

The purpose of running the online survey was threefold.

- To establish the response rate of the 'recontacts' to determine the viability of applying the collection method and incorporating the results into the report card analysis in future.
- To establish whether the online methodology attracts a younger cohort of respondents that could potentially be incorporated into the results of the CATI survey to improve the age profile of the community sample.
- To determine whether there is a significant difference in responses from online respondents that would question their potential integration with the main CATI survey results.

Each issue is addressed in turn below.

E1 Response rates

The number of recontacts was similar across the three year reporting periods, but a higher response rate was expecting from those recruited last year. Email addresses were available for 593 recontacts and everyone was sent an initial email reminding them that they had agreed to be recontacted and inviting them to complete the community survey again this year, with a link provided to the online survey. Two reminders were sent: the first after four days and a second reminder three days after that. Only 64 completed surveys were collected, representing a response rate of 10.8% which matches the 5%-15% predicted by the service provider given that some contacts were quite old. However, contrary to predictions there was an even response rate across the three year period. Full details are provided in Table E1.

The main problem was that the majority (66%) did not even open their emails. The subject header was "Gladstone Healthy Harbour Community Survey, we would like your opinion" which was designed to attract rather than deter a response, but possibly people are so used to receiving junk mail they only open mail from a recognised source. Twenty percent of emails bounced as addresses

were invalid. It was expected that this rate would be higher for the earlier contacts but this was not the case. The relatively high rate is an indication that people appear to change email address more frequently than had been expected.

Table E1. Response rate details for the online survey

Year of contact	Initial invites	Qualified	Address invalid	Not opened	Incomplete	Terminated
2014	205	20	36	138	10	1
2015	185	24	35	117	8	1
2016	203	20	45	134	4	0
Total	**593**	**64 (10.8%)**	**116 (19.6%)**	**389 (65.6%)**	**22 (3.7%)**	**2 (0.3%)**

E2 Demographic details

Unfortunately the online survey did not attract a higher proportion of younger respondents. There were no responses from the 18-24 year age group and only 6% (n=4) from the 25-34 year age group. The majority of the sample (56%) were 55 years or over. More males (59%) responded than females and education levels were high with over 36% having tertiary level education. A demographic comparison with the sample for the 2016 and 2017 CATI surveys is provided in Table E2. In 2017 the ability to access geographically specific mobile numbers improved the age profile of the sample, and the 2016 sample is included to provide a comparison with the previous landline only sample. The 2017 online sample did not provide any demographic improvements over the 2017 landline sample.

Table E2. Demographic details and comparisons

% respondents	2017 Online	CATI survey 2016	CATI survey 2017	2017 Mobile	2017 Landline
	n=64	n=401	n=401	n=232	n=169
Gender					
% male	59.4%	50.4%	50%	48.3%	52.7
Age category					
18-24 yrs	0.0%	6%	4.0%	5.2%	2.4%
25-34 yrs	6.3%	10%	15.2%	20.3%	8.3%
35-44 yrs	12.5%	17%	23.9%	25.0%	22.5%
45-54 yrs	25.0%	27%	21.4%	25.0%	16.6%
55-64 yrs	23.4%	18%	19.5%	17.2%	22.5%
65+ yrs	32.8%	21%	16.0%	7.3%	27.8%
Annual household income					
Less than $20,799	3.8%	10.2%	11.4%	10.1%	13.2%
$20,800 – $41,599	17.0%	11.5%	11.4%	8.8%	15.1%
$41,600 – $64,999	11.3%	10.0%	9.2%	8.8%	9.9%
$65,000 – $77,999	11.3%	6.5%	6.2%	5.1%	7.9%
$78,000 – $103,999	17.0%	13.5%	15.7%	17.1%	13.8%
$104,000 – $155,999[1]	20.8%	22.0%	20.3%	22.1%	17.8%
Greater than $156,000	18.9%	16.7%	25.7%	28.1%	22.4%
Details not provided	*n=11(17%)*	*n=39(10%)*	*n=32 (8%)*	*n=15(6.5%)*	*n=17(10%)*
Education					
Post school qualification	79.4%	n/a	52.6%	53.9%	50.9%
Tertiary level	36.5%	n/a	24.9%	26.7%	22.5%

E3 CATI vs online survey responses

Responses from the community survey are applied to help estimate scores for the Economic value (recreation) indicator group as well as all indicators in the Social and Cultural ('Sense of place') components. Independent Samples T-Tests (at the 5% level) were conducted to compare the responses of the CATI survey respondents with those of the online sample.

E3.1 Economic value (recreation)

The two primary factors of interest are participation frequency and satisfactory ratings for three recreational activities.

A comparison of the online and CATI responses indicated:

- Participation frequency:
  - no differences for beach and fishing recreation
  - **lower rates of land-based recreation for online** (mean 14 trips/yr vs 35 trips/yr)
- Satisfaction ratings:
  - no difference for fishing recreation
  - **lower rates for beach recreation for online** (mean 7.28 vs 8.11)
  - **lower rates for other land recreation for online** (mean 7.56 vs 8.31)

E3.2 Social indicators

There are 23 questions in the survey which apply to the estimation of 20 measures for social indicators. There was only a difference in responses to two of these questions. These related to the satisfaction ratings for beach and land-based recreation as outlined above.

E3.3 'Sense of place' indicators

There are 17 questions in the survey which apply to the estimation of measures for the 'Sense of place' indicators. There was only a difference in responses to three of these questions.

- Continuity indicator:
  - Significant difference in both of the two measure
  - **Online respondents had lived in the region longer** (mean 32.7 yrs vs 23.9 yrs)
  - **Online planned to live there longer** (mean 2.6 vs 3.9) Q.53 scale 1-10 response
- Attitudes indicator:
  - **Online higher score** (1-10 scale) for Q59.The Gladstone Harbour area is a **great asset for the economy of Queensland** (mean 9.2 vs 8.6)

E3.4 Summary

There was very little difference in the responses (only 6 cases out of 43 relevant questions) from the online vs CATI respondents suggesting that different collection methods do not have a strong influence on responses. However, the older age profile in the online survey did have an influential impact on the results for the Continuity indicator and were probably influential in the lower participation frequency rate for land-based recreation.

Overall, there does not appear to be a strong argument that the responses from online respondents are significantly different than those from the CATI survey.

However, the main argument against the online collection method is that it is not as representative of the community population as the CATI survey sample.

E4 Recommendations

Unfortunately the demographic profile of the online survey sample did not represent an improvement over the previous landline demographics. In particular, the age bias associated with the source sample was reinforced. The use of recontacts from the CATI survey does not appear to be a viable source of recruitment for an alternative sample.

At the time the decision was made to trial the use of an online survey, the ability to access mobile phones was unavailable. The results from the 2017 CATI survey have shown that the use of mobiles has provided some significant improvements in the age profile of the sample.

The online survey did not provide the desired demographic improvements, but that reflects the inadequacy of the recruitment process and not the mode of delivery. The online survey had a very professional, modern and attractive interface. It looked better than a standard SurveyMonkey interface. The cost of developing the online survey instrument has now been incurred and so the cost of running a survey in the future will be much lower. It is a resource that should not be wasted. The main limiting factor is in the recruitment process for respondents. Possible options to consider are:

- Provide an open link to the survey and advertise for recruits through social media, GHHP websites / local newspapers or newsletter etc. Particular encouragement could focus on the 18 to 24yrs group. Some form of snowballing could also be applied.
    - This approach of having an open link is not recommended as it potentially encourages bias associated with certain 'groups' of people.
- Develop a recruitment process where email addresses of willing participants are collected throughout the year from a range of potential sources. Such a process could help build an internet panel for the survey in coming years, but would require a large pool of potential recruits to provide a sufficient response rate and the desired demographic profile. Such an option could be run in parallel with the CATI survey for little additional cost (apart from the effort and cost of recruitment) to establish its efficacy.