

BE WHAT YOU WANT TO BE.



Final Report on the Status of the Social, Cultural (Sense of place) and Economic Components for the Gladstone Harbour 2016 Report Card

Jill Windle, Jeremy De Valck, Nicole Flint and Megan Star

School of Business and Law

CQUniversity

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Executive Summary

The Gladstone Healthy Harbour Partnership is one of the early pioneers to apply socio-economic considerations in an aquatic health report card, particularly in Australia. Report cards have become an increasingly popular tool to measure and record changes in ecosystem health over time. The main objective is to assist in environmental management and decision-making. While the inclusion of bio-physical indicators in aquatic report cards is well-established, the inclusion of social, cultural and economic indicators is less common. The challenge of assessing and reporting socio-economic indicators in a uniform and simplistic manner has limited their inclusion in aquatic health report cards.

The initial report card for Gladstone Harbour was piloted in 2014 and incorporated environmental, social, cultural and economic objectives. The aim of this project is to generate report card scores and grades for the Social, Cultural ('Sense of place') and Economic components of the Gladstone Healthy Harbour 2016 Report Card. The same methodology as applied in previous years is repeated again for this year. Full details of the methodology applied to assess the scores and grades are outlined in the 2014 (Pascoe et al. 2014) and 2015 (Cannard et al. 2015) report cards and the information is not repeated again in this report.

The Gladstone Healthy Harbour Report Card is now in its third year of production and it is possible to start identifying some trends and changes over time. The longitudinal results are allowing the report cards to become an even more meaningful management tool.

Assessment and analysis

The Gladstone Healthy Harbour 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, is collected from both primary and secondary sources. Primary data are collected in an annual community questionnaire survey of 401 respondents and secondary data are obtained from a range of regularly updated, publically available sources.

In order to establish the relationship between the measures, indicators and indicator groups, 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 indicator scores, 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. Full methods are described in Pascoe et al. (2014).

For the first time, this year there is an automated process of data analysis to estimate the scores and grades for the report card. The transition from manual to automated data analysis has revealed some anomalies in 2015 data sets and data analysis. Where applicable these have been noted in the report and details are outlined in the recommendations (Appendix E). The most notable of these relates to the Commercial fishing indicator and concerns are identified with the results for both 2015 and 2016.

Overall results

Social

The overall grade for the Social component of the 2016 Gladstone Harbour report card is a B (score of 0.66) which is an improvement on the C grade recorded in both 2015 (score of 0.64) and 2014 (score of 0.58).

The Social component is assessed through three social indicator groups, eight indicators and 13 measures. The 2016 scores and grades for the higher levels are presented below in Table E1.

Table E1: Scores for the 2016 social indicator groups and indicators

Indicator Groups	Score/ Grade	Social indicators	Score/ Grade
Harbour usability	0.66 (B)	Satisfaction with harbour recreational activities	0.67 (B)
		Perceptions of air and water quality	0.55 (C)
		Perceptions of harbour safety for human use	0.76 (B)
Harbour access	0.65 (B)	Satisfaction with access to the harbour	0.69 (B)
		Satisfaction with boat ramps + public spaces	0.64 (C)
		Perceptions of harbour health	0.62 (C)
		Perceptions of barriers to access	0.65 (B)
Liveability and wellbeing	0.66 (B)	Liveability and wellbeing	0.66 (B)

Since 2015, two of three indicator groups for the Social component have improved their grades. Both Harbour access and 'Liveability and wellbeing' have improved from a C grade in 2015 to a B grade in 2016. Harbour usability remains unchanged with a B grade. There has been an improvement in the scores for all the social indicators and two ('Perceptions of barriers to access' and 'Liveability and wellbeing') have improved from C grades in 2015 to B grades in 2016.

In the past year, there has been a comprehensive improvement in the social health of Gladstone Harbour with some increase in the score of all measures and indicators. The stronger trends in indicator scores are evident in the 'Perceptions of harbour safety for human use' (Harbour usability), 'Perceptions of harbour health' (Harbour access) and 'Barriers to access' (Harbour access).

The strongest improvement in the component measures relates to an improvement in the extent to which shipping activity impacts on recreational use of the harbour 'Shipping reduced my use'. This is a very positive result considering the increase in shipping activity related to the growth in exports of liquefied natural gas (LNG). However, it is likely that the improvement is a result of a reduction in the shipping/boating activity associated with transport and construction work on Curtis Island.

There has also been a clear improvement in community perceptions about water quality in the harbour over the past year. 'Perceptions of water quality'; the current condition of the harbour and improvement in harbour health over the past year, have all seen an increase. During the same period, the number of oil spills has reduced which may partly explain the improvement in community perceptions of harbour health.

The improvement in community feelings of safety in the harbour area at night is also encouraging.

Cultural ('Sense of place')

The overall grade for the Cultural ('Sense of place') component of the 2016 Gladstone Harbour report card was a B Grade (score of 0.66) with little change from previous years (score of 0.65 in 2015 and 0.64 in 2014).

The one indicator group ('Sense of place') comprises six indicators and 17 measures. The scores and grades for the higher levels are presented below in Table E2. There has been an improvement in the scores for all of the cultural indicators, but only 'Values of the harbour' has an improved grade, increasing from a C grade in 2015 to B grade in 2016.

Table E2: Scores for the 2016 cultural indicator groups and indicators

Indicator Group	Score/ Grade	Indicators	Score/ Grade
Sense of place	0.66 (B)	Distinctiveness	0.59 (C)
		Continuity	0.59 (C)
		Self-esteem	0.74 (B)
		Self-efficacy	0.58 (C)
		Attitudes to harbour	0.81 (B)
		Values of harbour	0.66 (B)

There is relatively little temporal variation in the scores for the indicators and measures for the 'Sense of place' indicator group, providing little information for commentary on possible trends.

There are three interrelated changes of note that point to likely improvements in community attitudes to Gladstone harbour, now that most of the disruption associated with construction of major projects is over. The main change is an improvement in community attitudes to the distinctiveness of Gladstone and there being 'no better place to live' (Distinctiveness: Q.30). This is probably interrelated with there being more stability in the community (more people plan to remain in Gladstone for more than 5 years (Continuity: Q.53). In turn, this is perceived to make the place more attractive to visitors (Values of harbour: Q.57).

Economic

The overall grade for the Economic component of the 2016 Gladstone Harbour report card is a B (score of 0.75). This score is similar to the scores recorded in 2015 (0.77) and 2014 (0.75), but some data analysis differences reduce the significance of any comparisons. Three indicator groups, eight indicators and 11 measures, were evaluated in the assessment process. The scores and grades for the indicator groups and indicators are summarised in the Table E3 below.

The 'Economic performance' indicator group improves from a B grade in 2015 to an A grade in 2016. The 'Economic stimulus' and 'Economic (recreational) value' indicator groups remain unchanged with a B grade.

Results for the economic indicators are varied. There have been increases in the scores for Shipping activity, Tourism, Land-based and Beach recreation, but decreases in the scores for Commercial fishing, Employment, Socio-economic status and Recreational fishing. Shipping activity has improved from a B grade to A grade; Tourism has improved from a C grade to B grade and Socio-economic status has dropped from an A grade to a B grade.

Table E.3: Scores for the 2016 economic indicator groups and indicators

Indicator Group	Score/ Grade	Indicators	Score/ Grade
Economic performance	0.87 (A)	Shipping activity	0.87 (A)
		Tourism	0.72 (B)
		Commercial fishing	0.43 (D)
Economic stimulus	0.74 (B)	Employment	0.62 (C)
		Socio-economic status	0.8 (B)
Economic (recreational) value	0.73 (B)	Land-based recreation	0.76 (B)
		Recreational fishing	0.66 (B)
		Beach recreation	0.75 (B)

In the past 12 months, there have been some clear gains but also some losses in the economic health of the harbour. The most significant impact has been the growth in LNG exports and the 'Economic performance' indicator group which is now rated as A grade; the only indicator group across the social, cultural and economic components to achieve this Very good grading. The completion of major construction projects has reduced employment opportunities and the unemployment rate has risen. There are also fewer high income employment opportunities. This has an adverse impact on the socio-economic status of the Gladstone community which has declined from 2014 and 2015 levels, but still remains relatively high (score of 0.80). The decline in the construction boom has some offsetting economic benefits for the tourism sector as the accommodation bottlenecks are easing. Another potential offsetting benefit is the improvement in recreational activity.

The productivity of commercial fishing remains in decline, but Gladstone continues to outperform neighbouring areas of Yeppoon and Mackay.

The total economic value of recreation has increased by 17% in the past year due to an increase in population size¹ (more people are participating in recreational activity) as well as an increase in frequency.

The average annual value of recreational trips for 2016 is:

- \$31.79 million for beach recreation (\$27.98 million in 2015)
- \$54.75 million for land-based recreation (\$45.43 million in 2015)
- \$24.43 million for recreational fishing (\$21.34 million in 2015)

The enjoyment people gain from recreational activity has also improved. However, these recreational gains relate to beach and land-based recreation (particularly the latter) and not to recreational fishing. Although the overall value of recreational fishing has increased, the relative frequency of trips has not changed and there has been a statistically significant decline in the level of satisfaction with the activity. It is not clear if this relates to a decline in catch rates.

¹ The population of Gladstone has increased from 66,097 in 2014 to 67,464 in 2015 (Queensland Governments Statistician's Office and as reported on the Gladstone Regional Council website <http://www.communityprofile.com.au/gladstone/population/age> (current at 12th Oct 2016).

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1. Introduction

Ports and harbours are a complex interface between environmental, economic and social systems. Trying to manage the social and economic needs of the community while maintaining the integrity of marine ecosystems is complicated and this limits the ability to evaluate the performance of resource management policies. To address this issue, report cards are being more commonly applied as an assessment and communication tool, particularly in relation to aquatic ecosystem management. A report card is a familiar assessment tool that is easy to understand and interpret, and can translate the complexity of ecosystem management into a readily and widely understood format. However, while the use of environmental report cards has increased, reporting has principally focused on bio-physical indicators and it is only more recently that attempts are being made to include social, cultural and economic indicators.

The challenge of assessing and reporting socio-economic indicators in a uniform and simplistic manner has limited their inclusion in aquatic health report cards. In a review of 14 aquatic monitoring and report card programs, only two cases were identified where either economic and/or social indicators were applied (Connolly et al. 2013). The Great Barrier Reef Report Card (Australian and Queensland Governments 2014) applies social (adoption of best management practices) as well as ecological indicators, while the Ocean Health Index (OHI) reports on ten goals and includes ecological, social and economic indicators². The OHI includes a number of social and economic goals such as Artisanal fishing opportunities, Coastal livelihoods and economies, Sense of place and, Tourism and recreation. More recently, the preliminary report card for the Mississippi River watershed, released in 2015, presented the overall status for six broad social, environmental, and economic goals (Transportation, Water supply, Flood control and risk reduction, Economy, Ecosystems, and Recreation)³ (America's Watershed Initiative 2015). In 2015, the Healthy Waterways program (which has been producing report cards for South East Queensland waterways since 2000) introduced a new Waterway Benefits Rating which measures the level of social and economic benefits to local communities in terms of Community satisfaction, Access, Recreation, Recreational fishing and Drinking water⁴.

The Gladstone Healthy Harbour Report Card encapsulates environmental, social, cultural and economic objectives. The focus of this report is on the last three components and the assessment of each is based on three levels of aggregation: indicator groups, indicators, and measures. 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
<ul style="list-style-type: none"> • Harbour usability • Harbour access • Liveability and wellbeing 	<ul style="list-style-type: none"> • Sense of Place 	<ul style="list-style-type: none"> • 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 ⁵

² <http://www.oceanhealthindex.org/> (accessed 28/07/16)

³ <http://americaswater.wpengine.com/reportcard/> (accessed 28/07/16)

⁴ <http://healthywaterways.org/report-card> (accessed 28/07/16)

⁵ Note that this number differs from the 13 measures indicated in Appendix A.

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 in the 2015 report card (Cannard et al. 2015). Some minor changes were applied to the economic secondary data sources due to lack of consistently available data. In addition, 'Sense of place' was the only indicator group to be assessed for the Cultural component. Indigenous cultural indicators were assessed in a separate project.

The current project is designed to collect the data to populate the 2016 report card applying the same previous determined methodology (Pascoe et al. 2014). The project team collected the baseline data to provide the scores for all of the measures. However, for the first time, this year there is an automated process of data aggregation to calculate the scores and grades for the higher level indicators, indicator groups and components (the Gladstone Healthy Harbour Partnership's Data and Information Management System (DIMS)).

1.2 Aims and objectives

The aim of this project is to collect details and provide information for the Gladstone Healthy Harbour 2016 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 Gladstone Healthy Harbour 2016 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 previous year (2015). A comparison with the baseline reporting year of 2014 will also be provided for the indicators and indicator group scores.
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 (Figure 1) 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. The objectives identified by the GHHP were based on the information provided by stakeholders and the GHHP at collaborative workshops in 2013 and are outline in Box 1.



Source: McIntosh et al. (2014)

Figure 1: The GHHP area

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 in Figure 2. The system matches that of the Australian education system and is the first environmental report card to do so. In this report, scores are reported for both measures and indicators. Grades are only reported at the indicator level and measures attract only scores but not grades. The scores calculated for the measures are used to generate the report card scores and grades at the indicator level. The tables with the indicator scores are colour-coded to indicate their grade (Figure 2).

A system of weights is assigned to all the separate measures, indicators and indicator groups that is applied in the aggregation process. Each element has a unique weighting. For example, each measure has its own weighting and the weighting combination of measures are unique to each indicator. More information is provided in the methodology section and full details are outlined in Pascoe et al. (2014). All weightings are based on the findings of 'expert' surveys conducted in 2014 for the initial pilot report card and details are provided in Pascoe et al. (2014).



Figure 2: The grading scale used in the 2016 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 had been identified in the 2014 pilot report card (Pascoe et al. 2014) with some minor modifications (in secondary data sources) outlined in the 2015 report (Cannard et al. 2015). Data were collected from both primary (community questionnaire survey) and secondary sources. Unless otherwise stated, the same data sources described in the 2015 report were applied.

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

2016, the same methods are repeated and in this report only a summary overview is provided for reference.

2.1 Indicators and data sources

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. The baseline data for all social indicator measures except for marine safety incidents and oil spills are based on 10 point scale questions in the CATI community survey. The baseline data for the cultural 'Sense of place' indicator measures all utilise the 10 point scale in the CATI community survey. The baseline data for all economic indicator measures utilise secondary economic data sources apart from the indicator group 'Economic (recreation) value' where information is applied from the CATI survey. In these cases, the baseline data is compared against a benchmark in order to determine a baseline score. The baseline scores for all the measures are subsequently weighted to obtain a report card score for each measure. It is the combination of the measures for each indicator that reflects the grade and not an average of the measure scores. Each measure is weighted and the weighting combinations of measures are unique to each indicator. The same applies in terms of weightings the elements at other higher levels of aggregation. Further information about the weightings is provided in Section 2.5.

2.1.1 Defining benchmarks

An estimate of performance requires measurement against some benchmark or reference level of each measure, indicator and indicator group. In the study, the A-E scale (Figure 2) was used for the final assessment, and also used for the indicator group and indicator assessment. Most measures were derived from a questionnaire survey with a 1-10 scale (1 being very unsatisfied; 10 being very satisfied). For these measures, a simple translation of 1-10 satisfaction scale to an A-E scale can be made. The assessment is based on the distribution of responses across the A to E Scale. The benchmarks for comparison are the previous year (2015) and the first year of reporting (2014).

For much of the secondary data, a range of different benchmarks were used, depending on the availability and form of the data. In most cases, the data were compared to similar data for other regions and/or time periods.

A formalised modelling approach (capacity utilisation) was applied to calculate the main measures in the Economic performance indicator group. In this case, a score between 0 and 1 is produced (or 0 and 100 depending on the measure), and the same proportional allocation to grades is made as for the survey derived data. As with any report card reporting system, there is the problem of shifting benchmarks, particularly when obtaining information on perceptions or satisfaction. For example, new residents to the area may be satisfied with the current state of the harbour as they do not have a prior point of reference to compare current conditions to. This is potentially a problem for both the survey-based information and the secondary data.

Table 1: Social component: Indicator groups, indicators and measures used to determine grades and scores

Indicator Groups	Indicators	Measures	Data Source	Baseline data
Harbour usability	Satisfaction with harbour recreational activities	How satisfied with last trip	CATI Survey	10 point scale
		Quality of ramps and facilities	CATI Survey	10 point scale
	Air and water quality	Water quality satisfaction	CATI Survey	10 point scale
		Air quality satisfaction	CATI Survey	10 point scale
		Water quality does not affect use of the harbour	CATI Survey	10 point scale
	Harbour safety	Marine safety incidents	Marine safety incidents: Department of Transport and Main Roads, Maritime Safety Queensland (2016) – Marine incidents in Queensland 2015	Data from 2006-2015 (calendar year) – Rate of incidents in Gladstone as compared to other Qld Ports
		Oil spills	Oil spills and marine pollution data: Queensland Government (2016) – Marine pollution data 2002-2016	Data 2006-2015 (calendar year) – Rate of oil spills in Gladstone as compared to other Qld ports
		Safe at night	CATI Survey	10 point scale
		Happy to eat seafood	CATI Survey	10 point scale
	Harbour access	Satisfaction with access to the harbour	Fair access to harbour	CATI Survey
Satisfaction with ramps and public spaces		Frequency of use	CATI Survey	10 point scale
		Number of ramps	CATI Survey	10 point scale
		Access to public spaces	CATI Survey	10 point scale
Perceptions of harbour health		Great condition	CATI Survey	10 point scale
		Optimistic about future health	CATI Survey	10 point scale
		Improved over the last 12 months	CATI Survey	10 point scale
Barriers to access		Marine debris a problem	CATI Survey	10 point scale
		Marine debris affects access	CATI Survey	10 point scale
		Shipping reduced use	CATI Survey	10 point scale
	Recreational boats reduced use	CATI Survey	10 point scale	
Liveability and wellbeing	Contribution of harbour to liveability and wellbeing	Makes living in Gladstone a better experience	CATI Survey	10 point scale
		Participate in community events	CATI Survey	10 point scale

Table 2: Cultural component: Indicator groups, indicators and measures used to determine grades and scores

Indicator Group	Indicators	Measures	Data source	Baseline data
Sense of Place	Measure of distinctiveness	No place better	CATI survey	10 point scale
		Who I am	CATI survey	10 point scale
	Continuity	How long lived in the area	CATI survey	10 point scale
		Stay five years?	CATI survey	10 point scale
	Self-esteem	Self-esteem	CATI survey	10 point scale
	Self-efficacy	Quality of life	CATI survey	10 point scale
		Input into management	CATI survey	10 point scale
	Attitudes to Gladstone Harbour	Key part of the community	CATI survey	10 point scale
		Great asset to the region	CATI survey	10 point scale
		Great asset to Queensland	CATI survey	10 point scale
	Values of Gladstone Harbour	Variety of marine life	CATI survey	10 point scale
		Opportunities for outdoor recreation	CATI survey	10 point scale
		Attracts visitors to the region	CATI survey	10 point scale
		Enjoy scenery and sights	CATI survey	10 point scale
		Spiritually special places	CATI survey	10 point scale
		Culturally special places	CATI survey	10 point scale
		Historical significance	CATI survey	10 point scale

Table 3: Economic component: Indicator groups, indicators and measures used to determine grades and scores

Indicator group	Indicator	Measure	Data source	Baseline data
Economic Performance	Shipping activity	Shipping activity productivity calculated from monthly shipping movements by cargo type (2015-16 financial year)	Gladstone Ports Corporation (GPC)	Time series data from 1996-1997 to 2015-2016
	Tourism expenditure	Gladstone Region's total tourism output – Expenditure on hotel accommodation and food in \$M (2014-15 financial year)	Expenditure on hotel accommodation (for 2005-06 to 2012-13 financial years) Expenditure on hotel accommodation and food (2013-14 & 2014-15 financial years) Gladstone Regional Council Economic Profile – REPLAN 2016: www.economicprofile.com.au/gladstone/t	Last ten years average for 2014-15
	Commercial fishing	Productivity of line fisheries	ABARES – Australian fisheries and aquaculture statistics 2014 (published Dec 2015) Queensland Fishing (QFish), Queensland Department of Agriculture and Fisheries Average prices (in \$/kg) for prawns, crab and fish derived from the Queensland production table in the ABARES – Australian fisheries and aquaculture statistics 2014 (published Dec 2015)	Queensland fisheries and aquaculture total production value 2013-2014. 12-year average (time series data from 2004-05 to 2015-2016)
		Productivity of net fisheries		
Productivity of trawl (otter) fisheries				
Productivity of pot fisheries				
Economic stimulus	Employment	The State of Queensland (Queensland Treasury) 2016: Unemployment statistics for the Gladstone Local Government Area (2016 June quarter)	Queensland Office of Economic and Statistical Research (via the Queensland Government Statistician's Office, Queensland Treasury)	Queensland 2016 distribution
	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

Indicator group	Indicator	Measure	Data source	Baseline data
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

2.2 Primary data collection

Primary data are collected to calculate the baseline scores for the social indicator measures (apart from two measures of harbour safety), cultural measures, and measures to assess economic recreational values.

Primary data are collected directly from the Gladstone community in an annual questionnaire survey. A Computer Assisted Telephone Interview (CATI) survey was conducted with residents in the last two weeks of June 2016. A total of 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. The questions and 10-point scale were designed so that the results would be comparable to other studies such as the Social and Economic Long Term Monitoring Program (SELTMP) for the Great Barrier Reef and to enable the elicitation of trends over time and simply translate into A-E report card grades.

Information collected in the CATI survey was primarily applied to score the social and cultural measures, with some additional information collected that applied to some economic indicators such as for the recreation and socio-economic status (see Table 3).

2.3 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.

2.3.1 Economic performance

The Economic performance indicator group consisted of three indicators: Commercial fishing, Shipping activity and Tourism (expenditure), which represented the key industries using the harbour.

Shipping

Data on monthly shipping movements (vessel counts) by cargo type, destination and origin were obtained from the Gladstone Ports Corporation (GPC), <http://www.gpcl.com.au/Pages/Trade-Statistics.aspx>. Cargo types were divided into four main categories: total coal exports (*Coal*), other exports (*OtherX*), total bauxite imports (*Bauxite*) and other imports (*OtherI*). Data for the 2015-16 financial year were

used in this report card. Shipping activity from 1996-97 to 2015-16, and potential future shipping activity related to developments on Curtis Island and at Fisherman's Landing were used as the basis for comparison⁶. The report card score for shipping activity was based on capacity utilisation (current level of activity relative to potential level of activity) and estimated through data envelopment analysis (DEA) with full details provided in Pascoe et al. (2014).

Tourism

The data file about tourism expenditure contains time-series data from 2000-01 to 2014-15. However, not all of this information was used to calculate the baseline. The baseline is a 10-year moving average, but the data it relies upon to be constructed has changed last year.

In 2014, the baseline was constructed using a 10-year average of expenditures on hotel accommodation (for 2003-04 to 2012-13 financial years). Back then, the information was sourced from <http://economy.id.com.au/gladstone>, which has now become inaccessible (see details in Pascoe et al, 2014).

In 2015, the 10-year moving average was then calculated using a different data source. It used data from the previous year plus data on expenditures on hotel accommodation and food for the financial year 2013-14, sourced from www.economicprofile.com.au/gladstone/tourism/output (see details in Cannard et al, 2015).

This year, the data collection process used last year was simply replicated to maintain as much comparability as possible. Expenditure on hotel accommodation (business trips and 'actual' tourism) and food for the financial year 2014-15 from www.economicprofile.com.au/gladstone/tourism/output. A new 10-year average was calculated from it, starting from 2005-06. The R script that computes the baseline was not modified⁷.

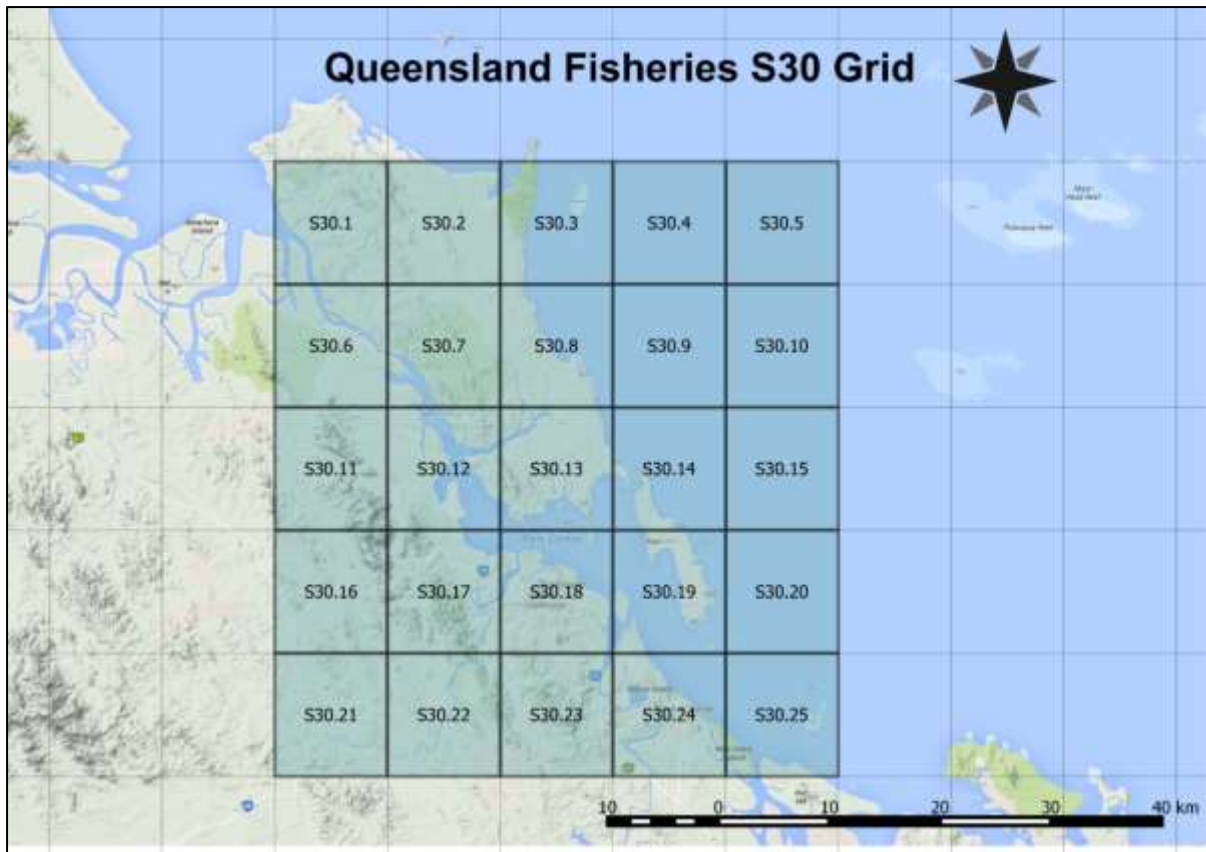
Commercial fishing

The report card score for Commercial fishing was based on the total value of the landed catch of both fish and crustaceans. Reported catch data came from four fishery sectors: the net, line, pot (mud crab) and otter trawl sectors, from QFish Grid areas S30, R29 and O25. Additional information about the average price for each species was derived from ABARES fisheries statistics (Savage and Hobsbawn 2015). The average prices relate to 2013-14, which are the most recent prices available. Commercial fishers operating in Queensland's state-managed fisheries are required to complete daily catch and effort logbooks. These logbooks detail where, when and how fishing took place, and what was caught. Catch and effort data are reported to the Queensland Department of Agriculture and Fisheries and stored within the QFish database.

Commercial fisheries data were collected from within Grid area S30 over the period 1989-90 to 2015-16. However, only the period 2004-05 to 2015-16 was used to compute the scores. Grid area S30 includes Gladstone Harbour and the open coastal waters immediately adjacent to the harbour (see Figure 3). The net, line and pot fishery sectors within Grid S30 operate almost exclusively inside Gladstone Harbour. However, the otter trawl fishery operates both inside and outside the harbour. The fishers involved in all four sectors are primarily based in Gladstone. The total value of fish and crustaceans caught in Queensland Fisheries Grid S30 in 2015-16 was estimated based on catch by fishing method data from the QFish database.

⁶ The 20 year data array applied in this report differs from previous years (9-year array in 2015 and 8-year array in 2014) as outlined in Appendix F.

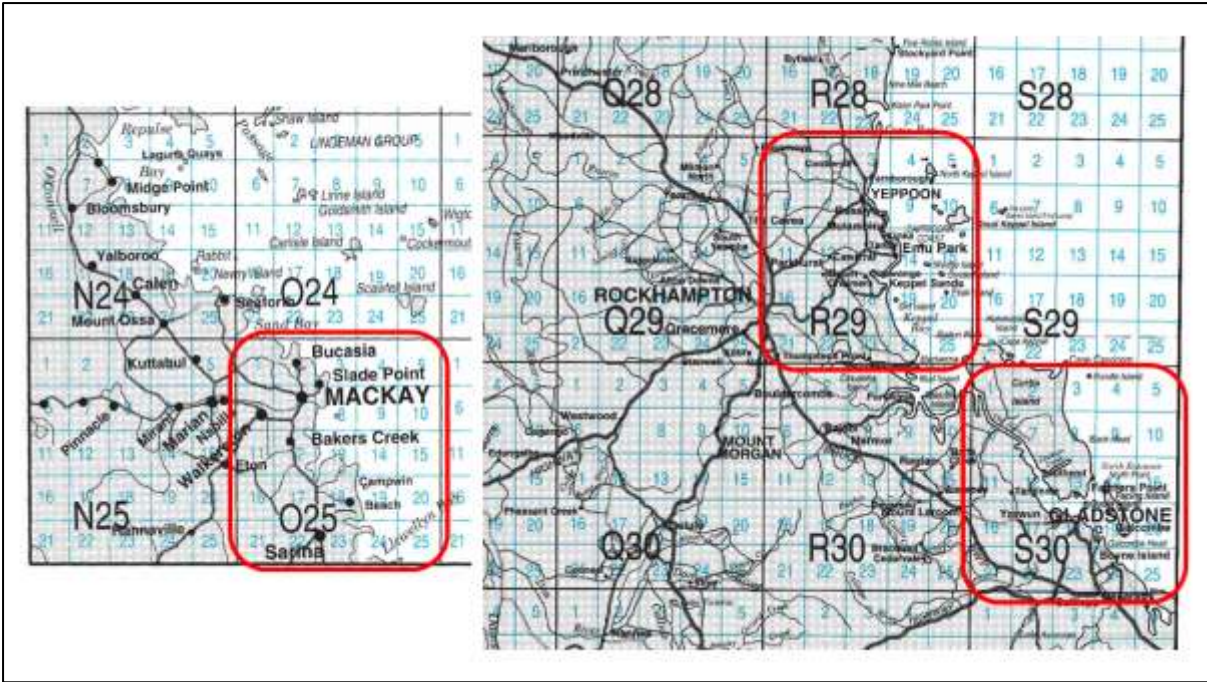
⁷ See Appendix F for further details.



Source: base map provided by Dr Mark Shultz at GHHP as presented in Cannard et al. 2015)

Figure 3: The Queensland Fisheries S30 Grid

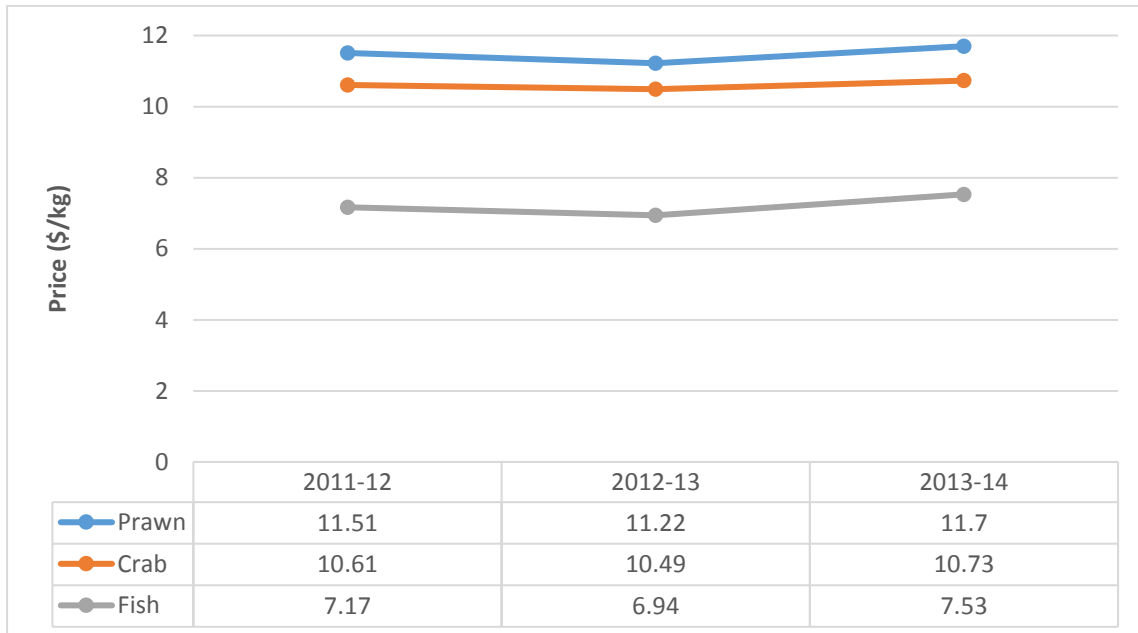
The total value of fisheries production in waters adjacent to Mackay (Grid O25) and Yeppoon (Grid R29) were also included in the analysis (Figure 4). These areas were added to control for spatial differences in catch across years as they provide more balanced information on fishing productivity in that region. In addition, it also attempts to control for fish mobility.



Source: <https://www.business.qld.gov.au/industry/fisheries/commercial-fishing/monitoring-and-reporting/reporting-commercial-fishers/queensland-logbook-maps> (accessed 23/09/16)

Figure 4: Mackay (Grid O25), Yeppoon (Grid R29) and Gladstone (Grid S30) fishing areas

Pricing data were derived from the most recent Australian fisheries and aquaculture statistics, published by ABARES in December 2015. For Queensland, the 2013-2014 average price was \$11.70/kg (=70,089,000/5,988,000) for prawns, \$10.73/kg (=29,982,000/2,793,000) for crab and \$7.53/kg (=64,299,000/8,542,000) for fish. Prices have remained stable in recent years (Figure 5).



Source: Adapted from ABARES, 2015:
http://data.daff.gov.au/data/warehouse/9aam/afstad9aamd003/2014/AustFishAquacStats_2014_v1.0.0.pdf

Figure 5: Prices for prawns, crabs and fish in Queensland over the past three years

2.3.2 Economic stimulus

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

The score for Employment was based on unemployment statistics for the Gladstone LGA provided by the Australian Bureau of Statistics (ABS). The most recent ABS data available for this report card were for the June 2016 quarter. Unemployment in the Gladstone LGA was compared with unemployment rates in all Queensland Local Government Areas.

The score for Socio-economic status was derived using an economic measure known as the Index of Economic Resources (IER). This index focuses on the financial aspects of relative socio-economic advantage and disadvantage by summarising variables related to income and wealth, excluding variables related to education and occupation (Pink 2013). This method takes into account income extremes (both high and low) in a population, as well as household ownership, costs of living and other indicators relevant to economic wellbeing in the community. The IER was formally calculated using 2011 Australian census data and estimates for the Gladstone region were revised using the information collected through the CATI survey conducted in June 2016. The IER also does not include information on savings or equities as these were not collected in the 2011 census.

The IER is a composite measure of the economic wellbeing of a community calculated using census data collected by the ABS. The index focuses on census variables such as the income, housing expenditure and ownership, cost of living and assets of households. The variables used in the index are also weighted by the ABS.

However, the index does not take into consideration education and occupation variables as these are not direct measures of economic resources. A revised estimate of IER calculated from CATI survey details for the Gladstone region was used to inform the Economic stimulus indicators.

2.4 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 recreational trips had been determined for beach recreation as well as other land-based recreation. In 2015, supplementary information was collected to provide value estimates for recreational fishing trips. Based on recommendations in the 2014 pilot report card (Pascoe et al. 2014), the recreational trip values will only be updated every five years, and therefore the same value estimates are applied in the 2016 report card.

Updated information was collected in the 2016 CATI survey about the frequency of recreational use and the quality of the experience. Information about the frequency of recreational use of the harbour area (in the last 12 months) was collected for three separate types of activity: beach recreation, land-based recreation and recreational fishing. Details about trip satisfaction for the three types of activity were also recorded.

2.5 Calculation and weighting of indicator groups, indicators and measure

In order to establish the relationship between the measures, indicators and indicator groups, a system of weights is applied. Each element is weighted to reflect its relative importance as a management objective. To aggregate the scores for the measures into indicator scores, 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. Full details are outlined in Pascoe et al. (2014).

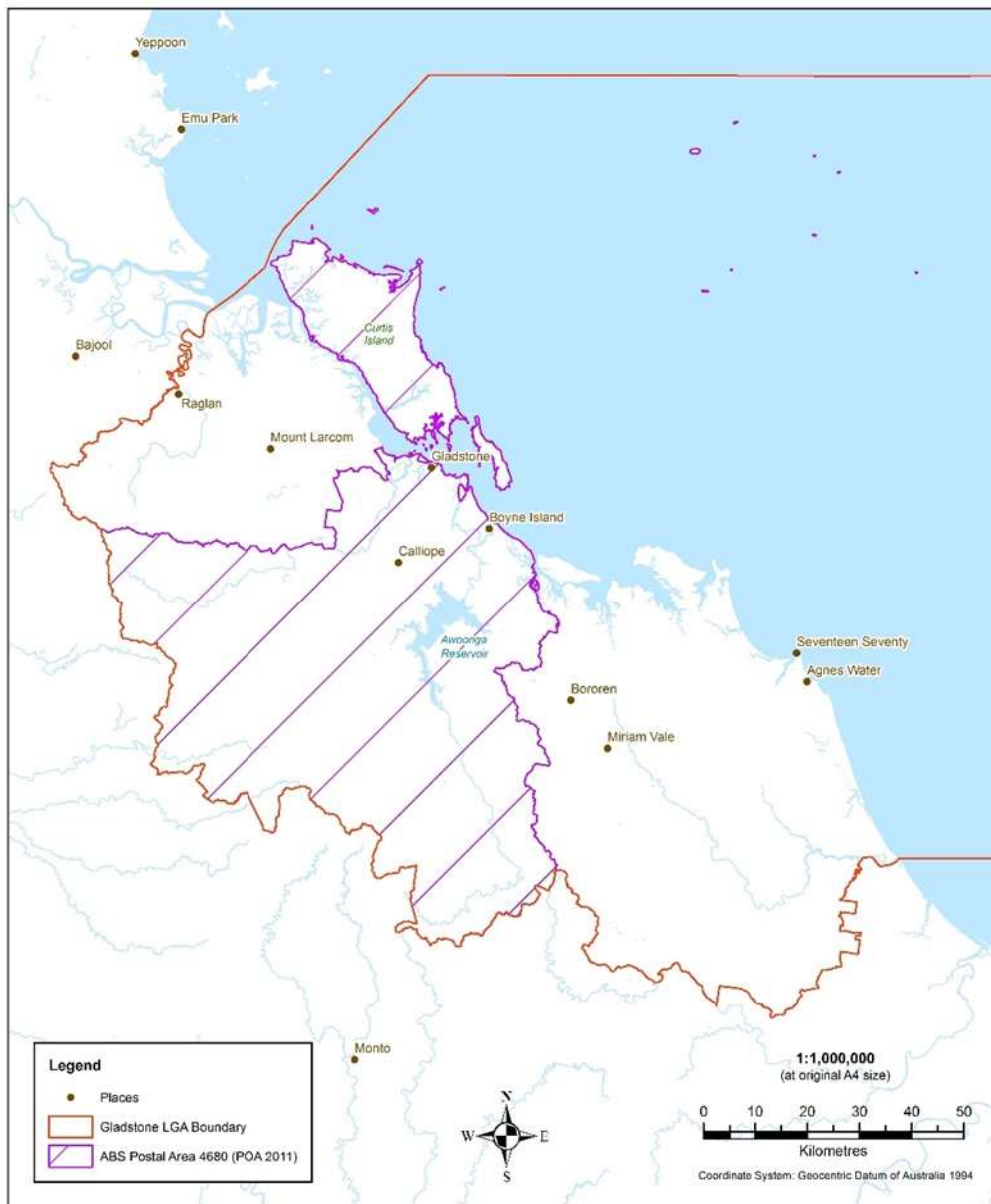
The relative weights were derived from the opinions of both community and expert responses. Opinions were collected from a selection of experts (i.e. those with a management or industry role), (n=31), and community members (n=200) in an online survey conducted in 2014. In addition, opinions from 19 marine or coastal-social scientists were used to develop the relationships and relative weighting for the social measures, indicators and indicator groups. See Pascoe et al. (2014) for details.

Three commonly used approaches to determine weights for each measure and indicator were applied and included: simple ranking approaches, scoring based approaches and the Analytic Hierarchy Process (AHP) based on a series of pair-wise comparisons (Mardle et al. 2004; Saaty 1980). The resulting weights were very similar between the expert and community groups. For full details of the methods used in this process, see Pascoe et al. (2014).

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 described above. The Gladstone LGA and Gladstone Postal Area are shown in Figure 6. The following reporting areas are applied:

- **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 Yeppoon (Grid R29), as depicted in Figure 4.
- **CATI survey:** the community survey was only administered to residents within the Gladstone Postal area as defined by the ABS. However, a number of other postcode districts fall within the Gladstone region. The combined population of these additional regions is only around 1,600 permanent residents compared to 33,000 in the Gladstone postcode area (most recent census figures in 2011) (ABS, 2011). Due to the difficulty associated with obtaining a representative sample from the other postcode areas, the CATI survey was only administered to randomly selected participants in the Gladstone Postal area (4680). A map to illustrate the geographical area covered by the survey is provided in Figure 6.



**Gladstone Local Government Area
with
Postal Area 4680**



This project is supported by Fitzroy Basin Association Inc. through funding from the Australian Government. Places, coastline, and major roads are shown as they appear in the 2011 Census. All other data is from the Australian Government of Natural Resources and Statistics (2011). Updated data available at: <http://www.abs.gov.au>. ABS Data: CC BY 3.0. © Commonwealth of Australia 2015. Source: Australian Bureau of Statistics. Disclaimer: © Fitzroy Basin Association Inc. 2015. In consideration of the Fitzroy Basin Association (FBA) permitting use of this data you acknowledge and agree that the FBA gives no warranty in relation to the data, including accuracy, reliability, or up-to-date-ness, currency or suitability for a particular purpose, including without limitation, liability or negligence for any loss, damage or costs (including consequential damage) arising in any use of the data.

Map Produced by Peter Smith
10 October 2015
In a report for Fitzroy Basin Association Inc., 2015
For further information contact:
Peter Smith
Fitzroy Basin Association Inc.
PO Box 170, Mackay, QLD, 4740
(07) 9999 2015
Peter.Smith@fba.org.au
FBA Ref No: CRH-LOA (5)

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

Figure 6: Gladstone Local Government area and Gladstone postal area

3. Results

The results for this project are provided in the following subsections. Initially, a demographic overview is provided of the CATI survey respondents 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 2016. 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 the 2016 CATI survey. The survey respondents matched the population (ABS 2011 census data for the Gladstone LGA) in terms of gender and household income, but not for age (Table 4). Respondents were evenly divided by gender, (50.4% male and 49.6% female) and matched the population in terms of household income distribution with exception of the household income bracket of \$130,000 - \$155,999 which was under-represented (Table 4). The income distribution also matched the community sample from previous years (Table 4).

Table 4: Demographic details of survey respondents and comparison with previous years

% respondents	CATI survey 2014	CATI survey 2015	CATI survey 2016	ABS Census (2011)
Gender				
% male	51%	49.5%	50.4%	52%
Age category				
18-24 yrs	3%*	3%*	6%*	11%
25-34 yrs	7%*	9%*	10%*	18%
35-44 yrs	20%	16%	17%	20%
45-54 yrs	25%*	26%*	27%*	19%
55-64 yrs	21%*	25%*	18%*	13%
65+ yrs	24%*	22%*	21%	19%
Annual household income				
Less than \$20,799	12%*	13%*	11%	8%
\$20,800 – \$41,599	13%	12%	13%	13%
\$41,600 – \$64,999	10%	11%	11%	12%
\$65,000 – \$77,999	5%	7%	7%	7%
\$78,000 – \$103,999	18%	14%	15%	15%
\$104,000 – \$129,999	12%	14%	13%	11%
\$130,000 – \$155,999	11%*	8%*	11%*	16%
Greater than \$156,000	20%	21%	19%	20%

* Binomial tests indicate a significant difference from the survey population

In previous years the community sample had been under-represented with respondents from the younger age groups and over-represented with people from the older age groups. In the 2016 survey, more attention was given to age distribution and representation was improved. Younger respondents from previous years were specifically targeted and recontacted to improve their representation. Although the proportion of respondents in the youngest age group (18-24 years) doubled from 3% to 6.5% this was still significantly lower than the population proportion of 11% (Table 4). This year, the sample proportion matched the population for the over 65 year age group but was still over represented by middle aged people (45-54 years) (Table 4).

Most survey respondents were long term residents and had lived in the area for an average of 26 years. The majority owned their homes without a mortgage (45%) or with a mortgage (43%), while 11% were renting.

Eleven percent of participants identified themselves as Traditional Owners of the area which was slightly lower than the 13% represented in the 2015 survey.

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 surveys participants were asked “when you think of the Gladstone Harbour area, what are the first three words that come to mind?” The preparation of words for analysis followed exactly the same process as undertaken in 2015, primarily all responses with two or more words were hyphenated to create one word and all entries of the word ‘none’ were removed as they indicated a respondent did not give three words. Spelling errors were corrected and some prepositions were removed e.g. Nice-to-be-on became Nice. These words were analysed using the web-based application *Wordle* to produce the word clouds (see www.wordle.net). This analysis gives greater prominence to words that appear most.

The word cloud produced and shown in Figure 7 is based on the first word provided by the respondent. The results suggest that most people recognise the industrial importance of the harbour and that the harbour is considered a beautiful place. The harbour is seen as a busy place and one where fishing is a prominent activity. It is also regarded as quite clean.



Figure 7: First word response from CATI survey respondents analysed and compiled into a word cloud (size indicates frequency of word)

The word cloud produced from the combination of the first three words provided by the respondent to this question is shown in Figure 8. When all three words are compiled, fishing becomes more prominent. The perception of the harbour being industrial, beautiful and relatively clean remains.



Figure 8: All three word response from CATI survey respondents analysed and compiled into word cloud (size indicates frequency of word)

One of the more apparent differences from the 2015 word clouds (Cannard et al. 2015) is the change from expressions of ‘pollution’ and ‘dirty’ to reference of the harbour being a ‘clean’ area. This change is evidenced by improvements in some social indicators as reported below.

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 applied as separate indicators. The scores for the three recreational indicators are based on the satisfaction ratings for the last recreational trip undertaken in the past year (for beach recreation, land-based recreation and recreational fishing) the three types of activity type). These scores are then weighted by their relative economic value (proportion of the total annual economic (nonmarket) value of recreation). 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 2016 Gladstone CATI survey. Only 37 respondents (9%) had not visited the Gladstone Harbour area in the last 12 months, and 347 (86.5%) respondents had visited the harbour for recreational purposes (no change from 2014 and 2015).

The majority of respondents (71%) indicated that their recreational use of the harbour had not changed in the last 12 months with more people reporting increased use (17% [2% more than 2015]) than decreased use (12% [5% less than 2015]). As occurred in the 2015 survey 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.⁸

⁸ 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.

Land-based and beach recreational activity was much more prevalent than recreational fishing. Over 90% of respondents had participated in land-based (93%) and beach recreation (92%), but only 39% had been recreational fishing.

More than a third of respondents (35%) indicated they own a boat. In the last 12 months, 163 (41%) respondents had used a boat ramp for an average of 19 times (average of 8 times for the whole sample). There had been little change in use of boat ramps from previous years (Appendix D).

3.3.1 Satisfaction rating scores

Information about the level of satisfaction with each of the recreational activity 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 8.12, 8.22 and 7.15 respectively). There has been a statistically significant (paired samples T-test) increase from 2015 in mean rating scores for beach ($t=2.525$; $p=0.012$) and land-based recreation ($t=2.236$; $p=0.026$) and a statistically significant decrease in the satisfaction with recreational fishing ($t=3.770$; $p=0.0000$). Full details are provided in Appendix D.

3.3.2 Annual economic value of recreational activity

The total annual value of the three types of recreational activity is estimated from the information collected about trip frequency (this survey), the travel cost economic values already calculated for the 2014 and 2015 Report Cards⁹ (Pascoe et al. 2014; Cannard et al. 2015) as well as updated information about the size of the Gladstone population.

There appears to have been a small increase in the frequency of recreational activity in the harbour for all three activities. Paired sample T-tests indicate there is a statistically significant increase in frequency (full sample) of beach recreation compared to 2015 ($t=5.351$; $p=0.0000$) and for other land-based recreation ($t=1.935$; $p=0.054$). The small increase in recreational fishing activity is not statistically significant.

The increase in recreational activity, as well as a population increase, results in small increases in the annual value of recreational activity compared with the previous year. The increase is most notable for land-based recreation, related to a larger increase in trip frequency compared with the other activities.

The average annual value of recreational trips for 2016 is:

- \$31.79 million for beach recreation (\$27.98 million in 2015)
- \$54.75 million for land-based recreation (\$45.43 million in 2015)
- \$24.43 million for recreational fishing (\$21.34 million in 2015)

3.3.3 Summary of changes in recreational activity

There has been a statistically significant increase in both the frequency and quality (level of satisfaction) of beach and land-based recreation in the harbour area. The increase in use may be a result of the small change in the demographics of the CATI survey respondents, with a greater proportion of younger people represented in the 2016 sample. It could also be related to improvements in harbour access as indicated by an improvement in the score for that Indicator group in the results for the Social component of the report card.

⁹ 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).

The improvement in the quality (satisfaction rating) of recreational activity could be related to the reduction in industrial activity in the harbour area as major construction projects, such as the development of the LNG plant on Curtis Island, have been completed. Results for the Social component of the report card also support this notion as there has been an improvement in Harbour usability.

There was no statistically significant change in the frequency of recreational fishing in the harbour, but there was a small, but significant decline in the quality of the activity which might be associated with the general increase in harbour traffic.

There is one important caveat to be considered in applying these results as has been noted in previous years. The CATI survey was conducted in a telephone interview which limited participation by younger people in the community. 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. Second, the frequency of undertaking recreational activity may differ between younger and older age groups. In the 2014 analysis, age was found to be significantly ($p=0.0019$) associated with lower trip frequency rates. In the 2015 survey, the results indicated that people over 45 years were significantly ($p=0.0049$) associated with higher trip frequency rates for recreational fishing activity. This year, as reported above older people (45 plus years) were less likely to have reported an increase in recreational activity in the past 12 months.

3.4 Social component results

The overall grade for the Social component of the 2016 Gladstone Harbour report card is a B (score of 0.66) which is an improvement on the C grade recorded in both 2015 (score of 0.64) and 2014 (score of 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 were eight indicators and 13 measures applied to determine the scores and grades for the three indicator groups (Table 5).

The baseline data scores for the measures to construct most of the social indicator scores and grades were 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 (for more details see Table 1). Full details of the results from the CATI survey are provided in Appendix C.

There is relatively little variation in the scores of the component indicator groups as well as their associated indicators, apart from the 'Perceptions of air and water quality' indicator (Harbour usability) with a lower score of 0.55 (Table 5).

The scores for all the indicators and measures are reported in Table 5 and summary comments are made in the subsections below. In comparison to 2015, there has been improvements in all the associated indicator scores as detailed in the subsections below.

Full details of the CATI survey results (unweighted scores) are provided in Appendix C along with information about statistically significant demographic differences.

Table 5: Scores for the Social component in the 2016 Gladstone Harbour report card

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

* Note: There was an analytical error in the estimation of this measure and the indicator score only reflects community satisfaction with the quality of boat ramps and associated facilities. Details are outlined in Appendix E1.1.

3.4.1 Harbour usability

The Harbour usability indicator group was assessed as being B grade with a score of 0.66, with little change from 2015 (score of 0.65¹⁰) but a stronger improvement from 2014 (score of 0.60).

This indicator group includes three indicators and the overall score for the group is reduced by a lower score for the indicator 'Perceptions of air quality and water quality'.

Satisfaction with recreational activities

The indicator 'Satisfaction with harbour recreational activities' scored 0.67, compared with 0.69 in 2015 and 0.70 in 2014, but anomalies in data analysis negate any meaningful comparison. An error in the 2016 calculation meant that only one of the two measures was assessed ('Quality of boat ramps and facilities') with a score of 0.68 in 2016 and 0.66 in 2015. The satisfaction scores for recreational activity reported above and in Appendix D indicate satisfaction ratings for beach and land-based recreation have improved since 2015 and declined for recreational fishing.

Perceptions of air and water quality

The indicator 'Perceptions of air and water quality' has a lower score of 0.55 which reduces the overall score for the indicator group. However, perceptions have been improving with a steady increase from 2015 (0.52) and 2014 (0.46). The low score for the measure assessing perceptions of air quality is driving the lower score for the indicator, but the scores for all measures are improving. The greatest improvement has been in the measure assessing improvements in water quality with details as follows:

- 'Water quality satisfaction' (Q40.I think water quality in Gladstone Harbour is in good condition) has increased from 0.51 in 2015 to 0.56 in 2016).
- 'Air quality satisfaction' (Q41.I think air quality in Gladstone Harbour is in good condition) has improved from 0.43 in 2015 to 0.45 in 2016.
- 'Water quality does not affect harbour use' (Q42.The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months) has increased from 0.61 in 2015 to 0.65 in 2016).

Perceptions about air quality receive a lower rating (0.45) than water quality (0.56) and the latter does not appear to have a strong adverse impact on community use the harbour (score of 0.65).

Perceptions of harbour safety for human usage

The indicator 'Perception of harbour safety for human use' received a score of 0.76, which is an improvement from 2015 (0.72) and a major improvement from 2014 (0.38). The measure scores in this indicator have been reversed and so higher scores reflect a reduction in the associated barriers.

There appears to be very little problem with marine safety incidents and oils spills as both measures scored highly (0.90 and 0.88 respectively; 0.88 and 0.82 in 2015). Although it should be noted that commercial vessel counts were not included in the assessment of the 'marine safety incidents' in 2016 but had been in 2015. The scores reflecting concerns about personal safety at night and about eating seafood were lower (0.63 and 0.60 respectively) but have improved in the past year (0.60 and 0.57 respectively in 2015). All four measures showed an improvement in scores from 2015.

¹⁰ Incorrectly reported in Cannard et al. 2015 as 0.75.

3.4.2 Harbour access

The 'Harbour access' indicator group was assessed as being B grade with a score of 0.65 which is an improvement from 2015 (0.62) and 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 0.69, compared with 0.68 in 2015 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 0.64, which is a small but steady improvement compared with 0.62 in 2015 and 0.60 in 2014. While the measures 'Number of ramps' and 'Access to public spaces' have good scores (0.67 and 0.72 respectively; 0.65 and 0.70 in 2015) the score for the indicator is reduced by the lower score for 'Frequency of use' (0.51; 0.49 in 2015). However, most people do not have (65%) or use (59%) a boat as reported in Appendix C.

Perceptions of harbour health

The indicator 'Perceptions of harbour health' scored 0.62, representing a steady improvement compared with 0.58 in 2015 and 0.53 in 2014. There have been increases in scores for all three measures (Table 5) representing improved perceptions about the condition of the harbour. Scores for:

- Great condition (Q33.The Gladstone Harbour area is not in great condition) have improved from 0.60 in 2015 to 0.65 in 2016;
- 'Optimistic about future health' (Q34.I feel optimistic about the future health of Gladstone Harbour) has increased from 0.57 in 2015 to 0.61 in 2016;
- 'Improved over the last 12 months' (Q35.The health of the harbour has improved in the past 12 months) has increased from 0.56 in 2015 to 0.61 in 2016.

Perceptions of barriers to access

The indicator 'Perceptions of barriers to access' scored 0.65, compared with 0.61 in 2015 and 0.64 in 2014. Three out of four measure scores well (>0.65) indicating 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 (0.51). The scores for all measures have increased from 2015 levels. Scores for:

- 'Marine debris is a problem' (Q36.Marine debris and litter is not a problem in Gladstone Harbour) remained the same at 0.50 in both 2015 and 2016.
- 'Marine debris affects access' (Q37.The amount of marine debris and litter in Gladstone Harbour affects my access to the area) improved from 0.67 in 2015 to 0.71 in 2016.
- 'Shipping reduced my use' (Q31.The amount of shipping in Gladstone Harbour has reduced my use of the area) improved strongly from 0.60 in 2015 to 0.69 in 2016.
- 'Recreational boats reduced my use' (Q32.The amount of recreational boating activity in Gladstone Harbour has reduced my use of the area) improved from 0.64 in 2015 to 0.66 in 2016.

3.4.3 Liveability and wellbeing

The 'Liveability and wellbeing' indicator group was assessed as being B grade with a score of 0.66 compared with a score of 0.64 in both 2015 and 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) (0.70 in 2015; 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) (0.53 in 2015; 0.55 in 2016). There have been small improvements in scores for both measures compared with 2015.

3.4.4 Social component summary

In the past year, there has been a comprehensive improvement in the social health of Gladstone Harbour with some increase in the score of all measures and indicators. The stronger trends in indicator scores (with a four point increase) are evident in the 'Perceptions of harbour safety for human use' (Harbour usability), 'Perceptions of harbour health' (Harbour access) and 'Barriers to access' (Harbour access).

The strongest improvement in the component measures relates to an improvement in the extent to which shipping activity impacts on recreational use of the harbour 'Shipping reduced my use' (with a nine point improvement). In the past 12 months, there has been a notable decrease in the proportion of respondents who agreed that shipping activity had reduced their use of the harbour area (16.5% in 2016; 32.8% in 2015). In comparison there has been little change in the impacts of recreational boating activity with 23.9% in 2016 agreeing that it had reduced their use of the harbour area compared with 25.0% in 2015¹¹.

This is a very positive result considering the increase in shipping activity related to the growth in LNG exports. However, it is likely that the improvement is a result of a reduction in the shipping/boating activity associated with transport and construction work on Curtis Island.

There has also been a clear improvement in community perceptions about water quality in the harbour over the past year. Perceptions of water quality; the current condition of the harbour and improvement in harbour health over the past year, have all seen a five point increase.

- In 2016, 60.1% agreed that water quality in the harbour is in good condition compared with 47.0% in 2015 [2015 reported value of 49% as per footnote above].
- In 2016, 74.6 % disagreed that the harbour was not in great condition compared with 65.8% in 2015.
- In 2016, 68.3% agreed that they felt optimistic about the future health of the harbour compared with 62.8% in 2015.
- In 2016, 60.6% agreed that the health of the harbour has improved in the past 12 months compared to 54% in 2015 [2015 reported value of 57%].

The number of oil spills has decreased (six point improvement in the score) which may partly explain the improvement in community perceptions of harbour health.

The improvement in community feelings of safety at in the harbour area at night is also encouraging.

¹¹ Note that the 2015 proportions have been calculated from the original 2015 dataset and differ from the reported levels outlined in the 2015 report (Cannard et al. 2015). Reported levels were 57% agreeing shipping activity had affected their use and 72% agreeing recreational boating had not affected their use (although the question was not asked in the negative).

3.5 Cultural ('Sense of place') component results

The overall grade for the Cultural ('Sense of place') component of the 2016 Gladstone Harbour report card is a B Grade (score of 0.66) with little change from previous years (score of 0.65 in 2015 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 are provided in Appendix C.

Since 2015, there has also been little change in the scores for the six indicators, apart from the Distinctiveness indicator which has seen a small increase.

The scores for all the indicators and measures are reported in Table 6 and summary comments are made in the subsections below. Full details of the CATI survey results (unweighted scores) are provided in Appendix C along with information about statistically significant demographic differences.

Table 6: Scores for the Cultural component in the 2016 Gladstone Harbour report card

Indicator Group		Score/Grade	Indicators	Score	Measures	Score
Cultural health (B)	Sense of place	0.66 B	Distinctiveness	0.59	No place better	0.56
					Who I am	0.62
			Continuity	0.59	How long lived in area	0.47
					Plan to stay in the next 5 years	0.71
			Self-esteem	0.74	Feel proud living in Gladstone	0.74
			Self-efficacy	0.58	Quality of life	0.67
					Input into management	0.49
			Attitudes to harbour	0.81	Key part of community	0.79
					Great asset to region	0.80
					Great asset to Queensland	0.80
			Values of harbour	0.66	Variety of marine life	0.71
					Opportunities for outdoor recreation	0.77
					Attracts visitors to the region	0.72
					Enjoy scenery and sights	0.75
					Spiritually special places	0.53
					Culturally special places	0.53
Historical significance	0.56					

3.5.1 Sense of place

The 'Sense of place' indicator groups 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. Scores for the two measures 'How long lived in area' (Continuity indicator) and 'Input into management' (Self-efficacy indicator) were the lowest, but with little change in the previous 12 months.

Distinctiveness

The Distinctiveness indicator scored 0.59, increasing from 0.55 in both 2015 and 2014. There are two measures for this indicator and the increase is associated with improvements in community response to the CATI survey question (Q30) "There are other places that are better than the Gladstone Harbour area for the recreational activities that I do". The score for this measure (0.56) increased from 0.47 in 2015. 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 2015.

Continuity

The Continuity indicator scored 0.59, increasing from 0.57 in both 2015 and 2014. There are two measures for this indicator. The 'How long lived in the area' measure (Q.3) had a low score of 0.47 (0.48 in 2015). The average time respondents have lived in the area is high at 26.5 years, but this is also a reflection of the average age of respondents which is quite high. 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 0.71 which is also an increase from 2015 (0.65). This provides an indication that the community is becoming less transient and more stable and may be a reflection of the downturn in construction work.

Self-esteem

The Self-esteem indicator scored 0.74 representing a small but steady increase compared with 0.72 in 2015 and 0.69 in 2014. This is the only measure for the indicator and relates to Q.50 (I feel proud that I live in the Gladstone community) in the CATI survey.

Self-efficacy

The Self-efficacy indicator scored 0.58 representing a small but steady increase compared with 0.56 in 2015 and 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, a slight increase from 0.65 in 2015. 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 0.49 in 2016 (0.48 in 2015).

Attitudes to the harbour

The 'Attitudes to the harbour' indicator received the highest score of all indicators in this group. The 2016 score of 0.81 was similar to the score of 0.80 in 2015 and 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 0.79, 0.80, and 0.80 respectively, remain the same as in 2015 (only a two point increase for Q58).

Values associated with the harbour

The 'Values associated with the harbour' indicator received a score of score of 0.66, a slight increase from the score of 0.64 in 2015 and 2014. There are seven measures for this indicator with details and scores outlined in Table 6. There is a slight increase in the scores of all measures since 2015 (one or two points), apart from the 'Attracts visitors to the region' (Q57. I value the Gladstone Harbour area because it attracts visitors to the region) measure which showed a four point increase.

3.5.2 Cultural component summary

There is relatively little temporal variation in the scores for the indicators and measures for the 'Sense of place' indicator group, providing little information for commentary on possible trends.

There are three interrelated changes of note that point to likely improvements in community attitudes to the Gladstone now that most of the disruption associated with construction of major projects is over. The main change is an improvement in community attitudes to the distinctiveness of Gladstone and there being 'no better place to live' (Distinctiveness: Q30). This is probably interrelated with there being more stability in the community (more people plan to remain in

Gladstone for more than 5 years (Continuity: Q53). In turn, this makes the place more attractive to visitors (Values of harbour: Q57).

In many cases there has been little or no change in the score of indicators and measure from 2014, but it is not clear whether this is because there has not been much change in community attitudes or whether the measures themselves and process of elicitation (a telephone survey) are not sufficiently sensitive to detect any changes.

3.6 Economic component results

The overall grade for the Economic component of the 2016 Gladstone Harbour report card is a B (score of 0.75). This compares to the score recorded in 2015 (0.77) and 2014 (0.75).

In total there were eight indicators and 11 measures applied to determine the scores and grades for the three indicator groups in the Economic component (Table 3). Note that there are some differences in the measures reported in Appendix A.

There is little variation in the scores of the component indicator groups Economic stimulus and Economic value, while Economic performance has a notably high score of 0.87 (Table 7). Overall, there has been a strong improvement in the Economic performance indicator group compared to 2015. While there is an apparent decrease in the score for Economic stimulus compared with 2015, there have been some confounding changes in data analysis. Full details of the scores for the three indicator groups are outlined in the sub-sections below.

Table 7: Scores for the Economic component in the 2016 Gladstone Harbour report card

Indicator group		Score/ Grade	Indicators	Score	Measures (see Table 3 for details)	Score
Economic health (B)	Economic performance	0.87 A	Shipping activity	0.87	Shipping activity: productivity	0.87
			Tourism	0.72	Expenditure on hotel accommodation and food	0.72
			Commercial fishing	0.43	Line fisheries: productivity	0.27
					Net fisheries: productivity	0.34
					Trawl fisheries: productivity	0.38
					Pot fisheries: productivity	0.65
	Economic stimulus	0.74 B	Employment	0.62	Unemployment statistics for the Gladstone LGA	0.62
			Socio-economic status	0.80	Index of economic resources	0.80
	Economic (recreational) value	0.73 B	Land-based recreation	0.76	Satisfaction rating from CATI survey + value from 2014 survey	0.76
			Recreational fishing	0.66	Satisfaction rating from CATI survey + value from 2015 survey	0.66
			Beach recreation	0.75	Satisfaction rating from CATI survey + value from 2014 survey	0.75

3.6.1 Economic performance

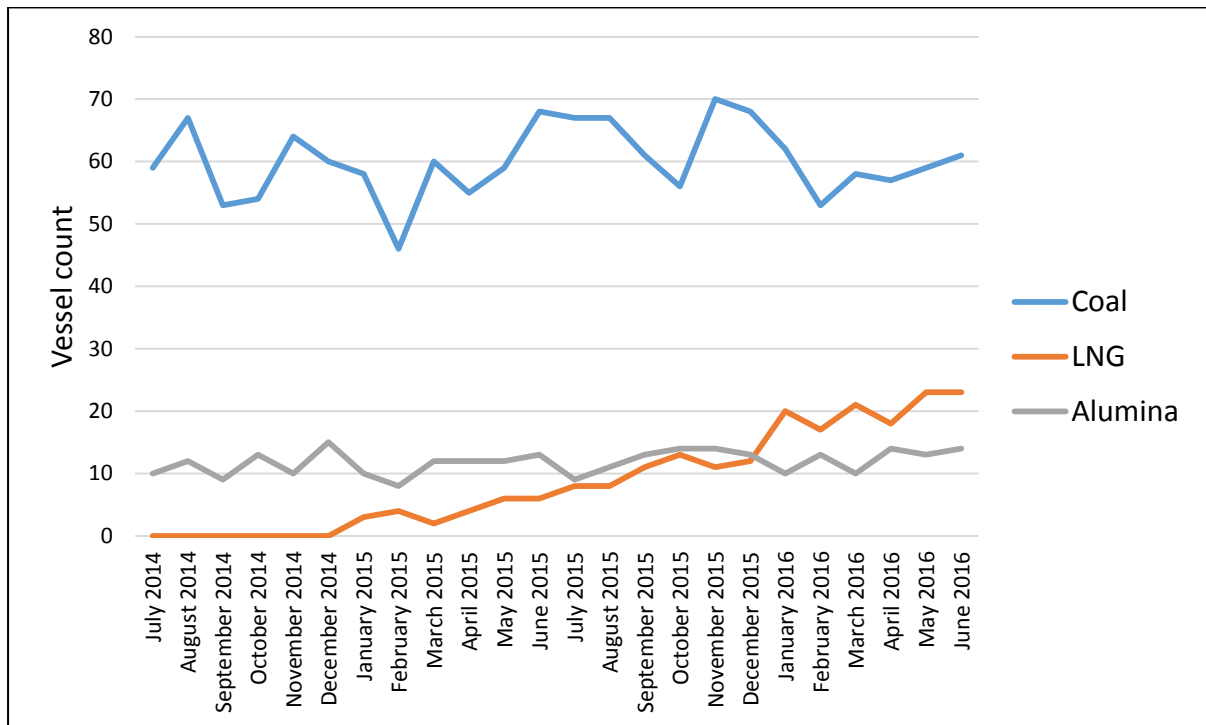
The Economic performance indicator group was assessed as being A grade with a score of 0.87 which is an improvement from 2015 (0.79) and 2014 (0.83).

This indicator group includes three indicators (Shipping activity, Tourism and Commercial fishing) but the overall score is dominated by the score for Shipping activity. Commercial fishing has a very low score but this does not appear to adversely impact on the group score as would be expected. Some data analysis issues have been identified with the calculation of the scores for the Commercial fishing indicator. This makes any trend analysis for the indicator problematic and the high score for the indicator group may be overstated.

Shipping activity

The Shipping activity indicator scored 0.87, which represents a steady increase compared with 0.82 in 2015 and 0.83 in 2014. As outlined in the methods section, 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, bauxite imports and other imports.

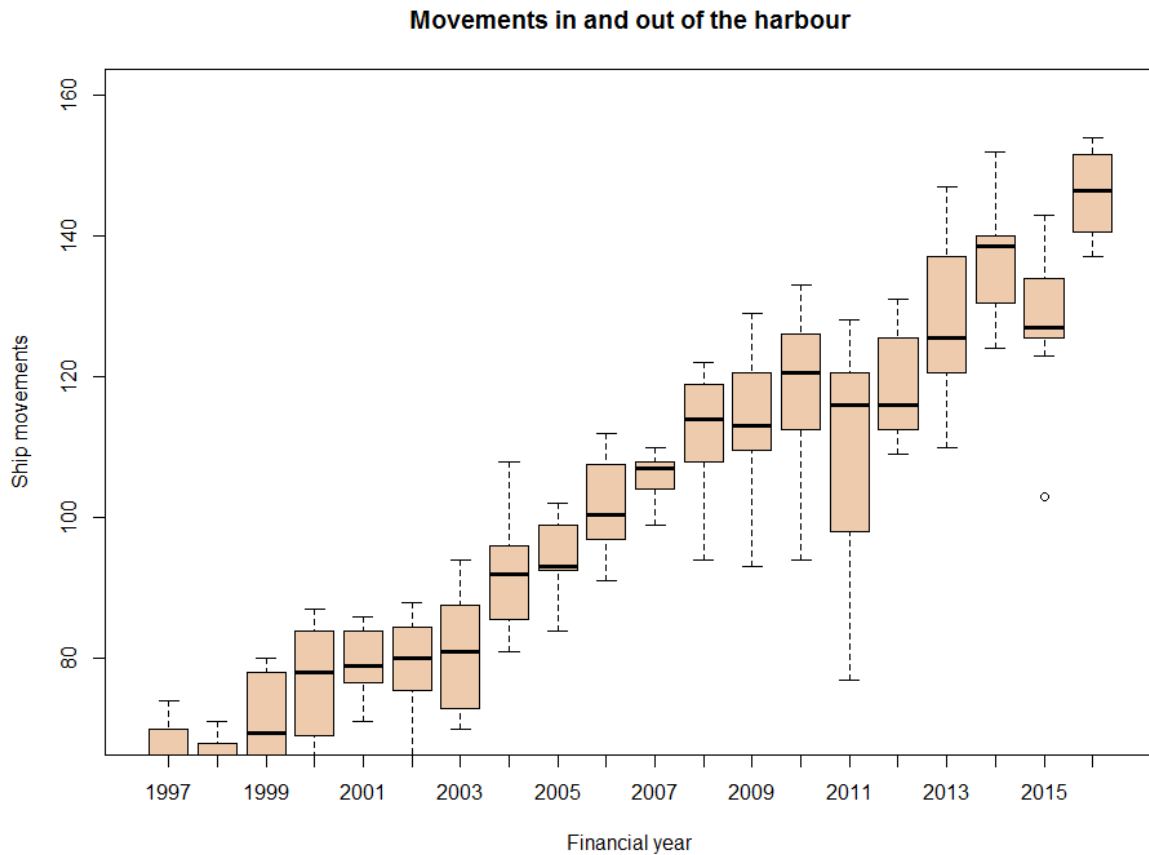
Unlike previous years, where coal exports usually accounted for around two thirds of export shipping, in 2016 the proportion of coal in total exports in Gladstone dropped by about 10%. Coal exports remained fairly stable but other exports gained in importance over the past year at an average of about 20 vessels/month (Figure 9). Exports in LNG which began in January 2015, have been steadily increasing and since January 2016 they have overtaken alumina exports (historically the second largest export in Gladstone). Bauxite remains the major import in Gladstone, accounting for around half of import shipping because of its importance for the aluminium industry.



Source: Gladstone Ports Corporation, <http://www.gpcl.com.au/Pages/Trade-Statistics.aspx> (accessed 23/09/16)

Figure 9: Trends in the three main commodity exports from Gladstone harbour over the financial years 2015 and 2016

Despite the slight dip in the total quantity of ship movements observed last year, there is a clear rise in 2016, with total monthly vessel counts exceeding 150 on a regular basis. This is a very positive indication on the economic health of Gladstone Harbour. Overall, there has been a steady increase in vessel movements in Gladstone Harbour over the past 20 years (Figure 10) reflecting the economic benefits of continued industrial development for the Gladstone community.



Source: Gladstone Ports Corporation, <http://www.gpcl.com.au/Pages/Trade-Statistics.aspx> (accessed 23/09/16)

Figure 10: Gladstone Harbour shipping movements for years 1997 -2016

Overall, capacity utilisation continues to rise and remains high. This is particularly obvious when looking at the trend in capacity utilisation over the past twenty years. When expectations of future shipping from the Curtis Island LNG plants (already in progress) and associated with the expansion of Fisherman’s Landing are factored in, the capacity utilisation score is reduced (Figure 11), but still remains very high at 0.87.

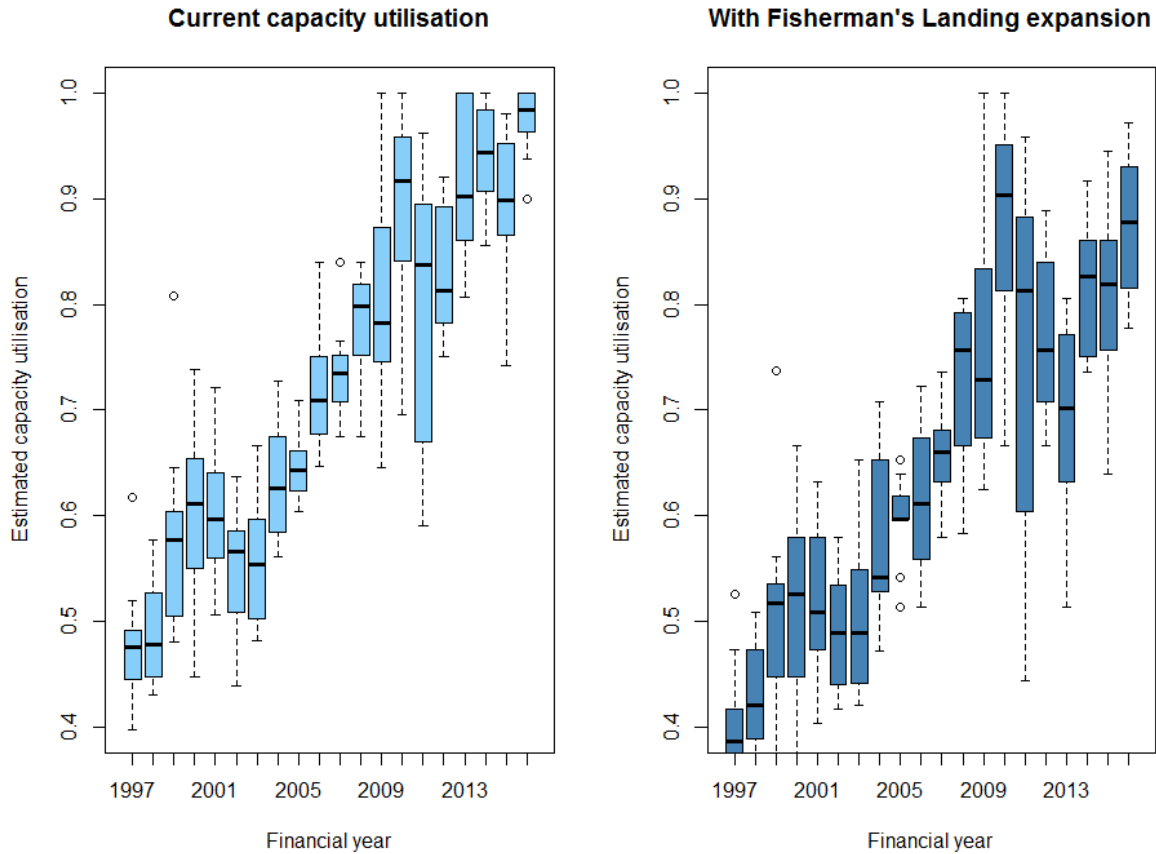


Figure 11: Data calculating relative capacity utilisation with a) current facilities and b) with Fisherman's Landing expansion

Information provided in the Gladstone Ports Corporation Annual Report about the revenue generated in the harbour has not been updated since 2015 and details remain the same as outlined Cannard et al. (2015).

Tourism

The Tourism indicator has a good score (0.72), which is a strong improvement compared with 0.64 in 2015 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 \$274.8 million in 2014-15 compared with \$266.7 million in 2013-14.

Although some data analysis differences have occurred over the three year reporting period, it is reasonable to assume there has been a real improvement. Now that the construction phase for many developments has been completed it has removed some of the bottlenecks in accommodation and other facilities that were adversely impacting on Tourism.

Commercial fishing

The Commercial fishing indicator has a low score of 0.43 which is a sharp decline from 2015 (0.63) and 2014 (0.66). This score relies upon the calculation of the Gross Value of Production (GVP) for Gladstone harbour fisheries for 2015-16 and is based on fishery productivity relative to the 12 year

average (starting from 2004-05)¹². The indicator is comprised of scores originating from four measures: Line fisheries (0.27), Net fisheries (0.34), Trawl fisheries (0.38) and Pot fisheries (0.65) (Table 7) which are then weighted by their relative contribution to GVP.

This year, the GVP for Gladstone Harbour fisheries was of \$2.83 million, well below the values for last year (\$4.19 million) and for 2013-14 (\$4.68 million)¹³. Historically, there has been considerable variation in the GVP for Gladstone over the past twelve years, but there is an apparent decline in the past two years (Figure 12). Despite the decline in productivity, the sector remained relatively strong when compared with neighbouring harbours (Figure 12).

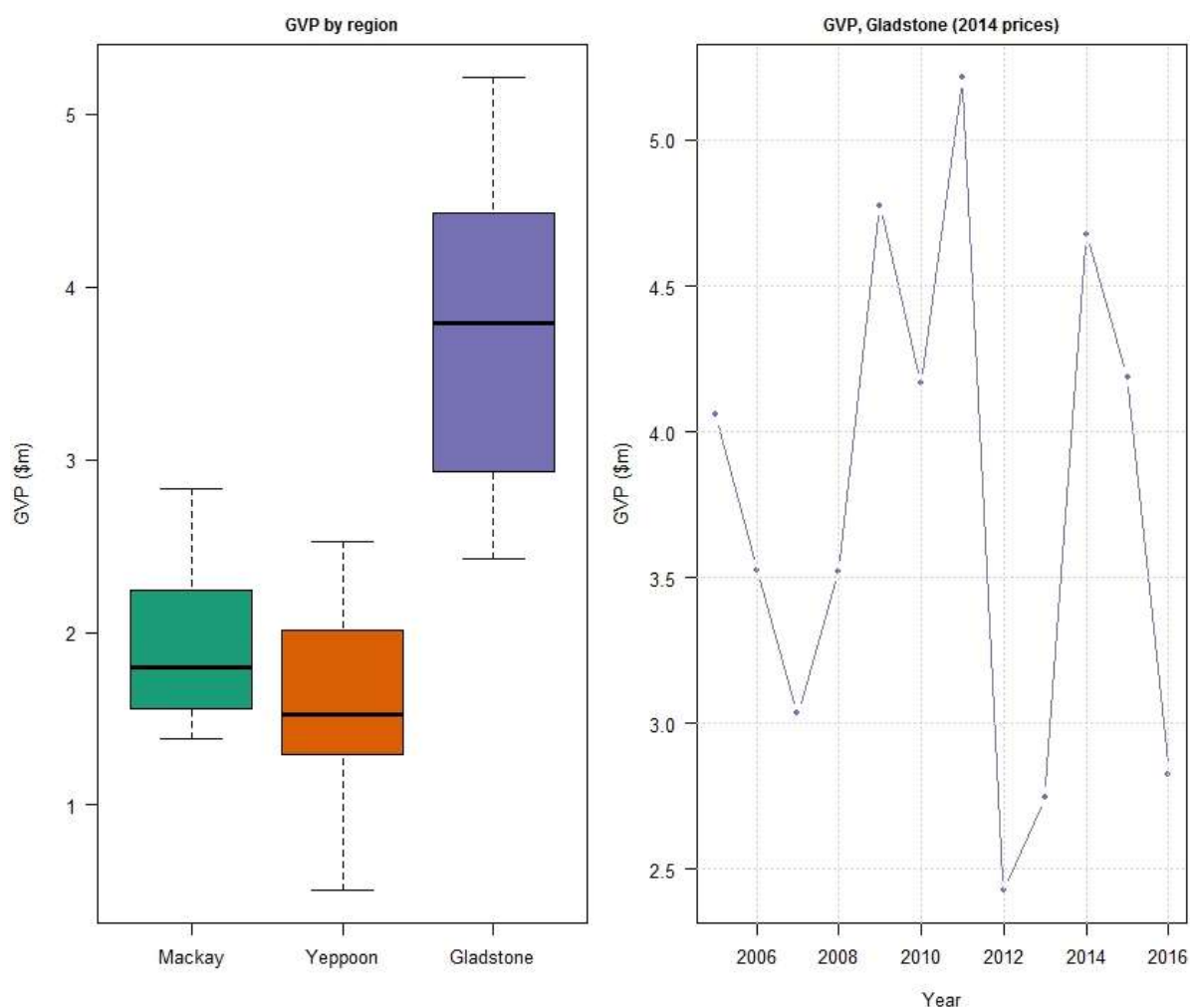


Figure 12: Gross Value of Production (GVP) of regional fisheries and Gladstone prices

The low score for the indicator is largely driven by the low score for all fisheries except Pot fisheries. The main changes since 2015 is the substantial decrease in score for Trawl fisheries (0.38 in 2016; 0.83 in 2015). There has been a small increase in the score for Net fisheries (0.34 in 2016; 0.30 in 2015), while the 2015 scores for Line fisheries and Pot fisheries were not reported.

¹² Further details on the selection of a 12-year average are provided in Appendix F.

¹³ Note that the Gladstone GVP values reported for last year and for 2013-14 differ from last year's report (where they equalled to \$3.5 and \$4.5 million, respectively). As all calculations were made in the same way, this is due to the recurrent updates made to the QFish database (upon which all fishery productivity scores are based) and that modify the entire source data file.

3.6.2 Economic stimulus

The Economic stimulus indicator group was assessed as being B grade with a score of 0.74 which is significant decline from a score of 0.82¹⁴ in 2015 and 0.87 in 2014. There are two indicators in this group: Employment and Socio-economic status, with declines in both scores compared with 2015.

Employment

The Employment indicator received a score of 0.62 representing a decline from 2015 (0.64) 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 2016, the unemployment rate for the June Quarter was 6.3% compared to a rate of 4.7% reported in 2015, but is still lower than the State average 6.5%. However, in the last 12 months the relative position of Gladstone deteriorated slightly compared to other LGAs in Queensland from being within 36% to 44% of the cumulative unemployment proportion for the State.

Socio-economic status

The Socio-economic status indicator receives a high score of 0.80 compared with an even higher score of 0.95¹⁵ in 2015 and 0.90 in 2014. So while the socio-economic status of the community remains high, the impact of job losses and increases in unemployment are apparent. However, the high score for Socio-economic status was still driven by the high proportion of residents who were in high income groups and the relatively large size of houses in the region (as reported in 2015). The reported (2015) influence of the relatively high proportion of home ownership had declined as one of the top three drivers, being replaced by the influence of the higher proportion of adults (over 18 years) in the household.

Statistical T-tests 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 household income ($t=2.814$; $p=0.005$) and car ownership ($t=2.71$; $p=0.007$) (Q67 and Q74 in the CATI survey) and statistically significant increases in the house size (more bedrooms) ($t=2.602$; $p=0.009$) as well as children under 15 years ($t=2.958$; $p=0.003$) (Q75 and Q70 in the CATI survey).

3.6.3 Economic value (recreation)

The Economic value indicator group was assessed as being B grade with a score of 0.73 compared with a score of 0.72 in 2015 and 0.75 in 2014. There are three indicators in this group represented 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 proportion of the total annual nonmarket value of recreation.

The total annual value of recreation has increased by 17% from \$95 million in 2015 to \$111 million in 2016. The largest gain is in land-based recreation, increasing by 21% from \$45 million in 2015 to \$55

¹⁴ A value of 0.715 was estimated when the same 2015 data sets were recalculated using the automated process from the R script as applied for the 2016 data. It is possible there was an error in the original 2015 analysis.

¹⁵ A value of 0.74 was estimated when the 2015 data sets were recalculated using the automated process from the R script as applied for the 2016 data. It is possible there was an error in the original 2015 analysis as per prior footnote.

million in 2016. The values for beach and fishing recreation both increased by 14% from \$28 and \$21 million in 2015 to \$32 and \$24 million in 2016 respectively.

Land-based recreation and Beach recreation received higher scores than Recreational fishing (Table 7) following the pattern of previous years. In 2016, the scores for Land-based recreation (0.76 in 2016, 0.73 in 2015 and 0.76 in 2014) and Beach recreation (0.75 in 2016, 0.70 in 2015 and 0.71 in 2014) had increased from 2015, but there was a decline in the satisfaction gained from Recreational fishing (0.66 in 2016, 0.71 in 2015 and 0.67 in 2014). It is not clear from the survey data whether this decline might be associated with lower catch rates or other factors. Perceptions about water quality (which could influence satisfaction ratings) remain relatively low but have improved since 2015 (Table 5 and Harbour usability section).

3.6.3 Economic component summary

In the past 12 months, there have been some clear gains but also some losses in the economic health of the harbour. The most significant impact has been the growth in LNG exports and the Economic performance indicator group is now rated as A grade, the only indicator group to have such a rating across the social, cultural and economic components. The completion of major construction projects has reduced employment opportunities and the unemployment rate has risen. There are also fewer high income employment opportunities. This has an adverse impact on the socio-economic status of the Gladstone community which has declined from 2014 and 2015 levels, but still remains relatively high (score of 0.80). The decline in the construction boom has some offsetting economic benefits for the tourism sector as the accommodation bottlenecks are easing. Another potential offsetting benefit is the improvement in recreational activity.

The total economic value of recreation has increased by 17% in the past year due to an increase in population size (more people are participating in recreational activity) as well as an increase in frequency. The enjoyment people gain from recreational activity has also improved. However, these recreational gains relate to beach and land-based recreation (particularly the latter) and not to recreational fishing. Although the overall value of recreational fishing has increased, the relative frequency of trips has not changed and there has been a statistically significant decline in the level of satisfaction with the activity. It is not clear if this relates to a decline in catch rates.

The productivity of commercial fishing continues to decline, particularly in the productivity of trawl fishing but Gladstone continues to outperform neighbouring areas of Yeppoon and Mackay.

4. Summary, discussion and conclusion

A summary overview of the mean scores and standard deviation, as well as the distribution of the A-E grades are provided for the Social component in Figure 13(a-d); the Cultural ('Sense of place') component in Figure 14, and the Economic component in Figure 15(a-d)

Social component details (Figure 13a-d)

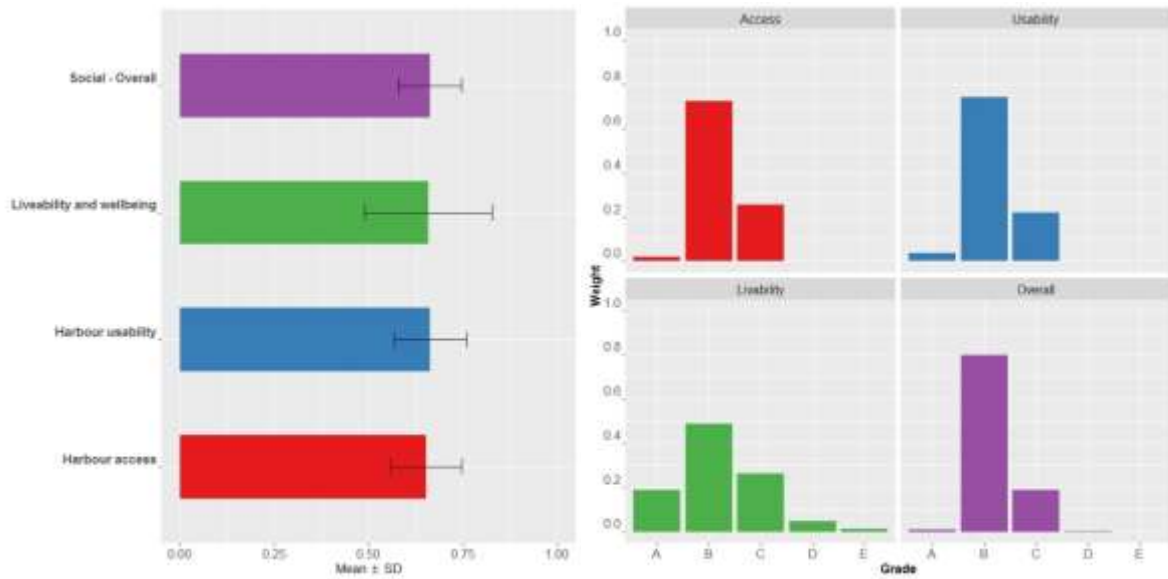


Figure 13a: Social component: Mean scores, standard deviations and A-E grade distribution for the overall Social component and indicator groups

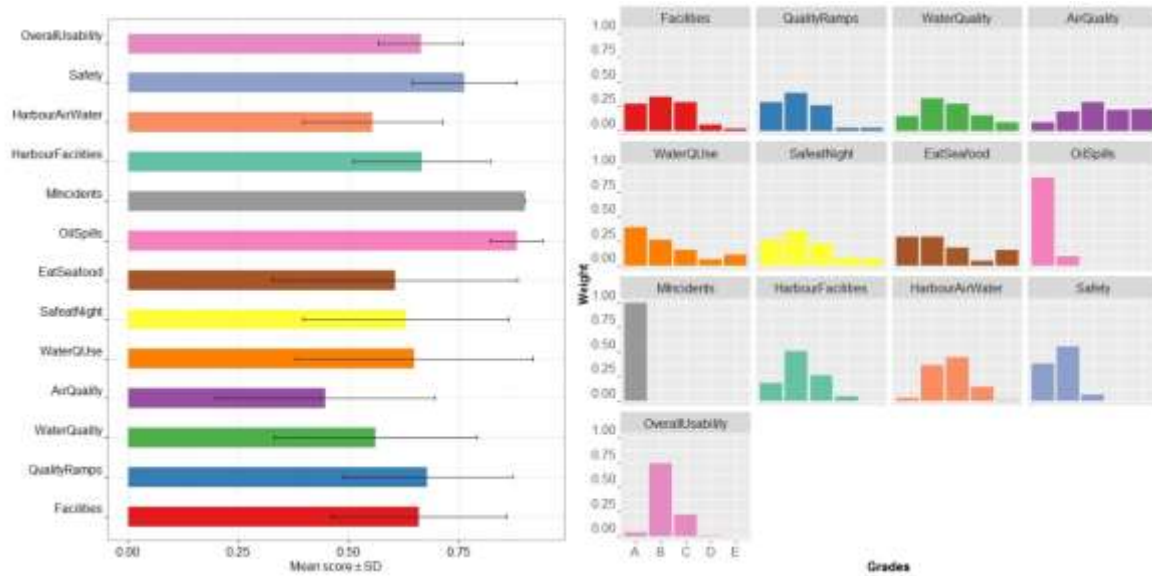


Figure 13b: Harbour usability indicator group: Mean scores, standard deviations and A-E grade distribution for the overall indicator group, indicator and measures

Social component details (Figure 13a-d)

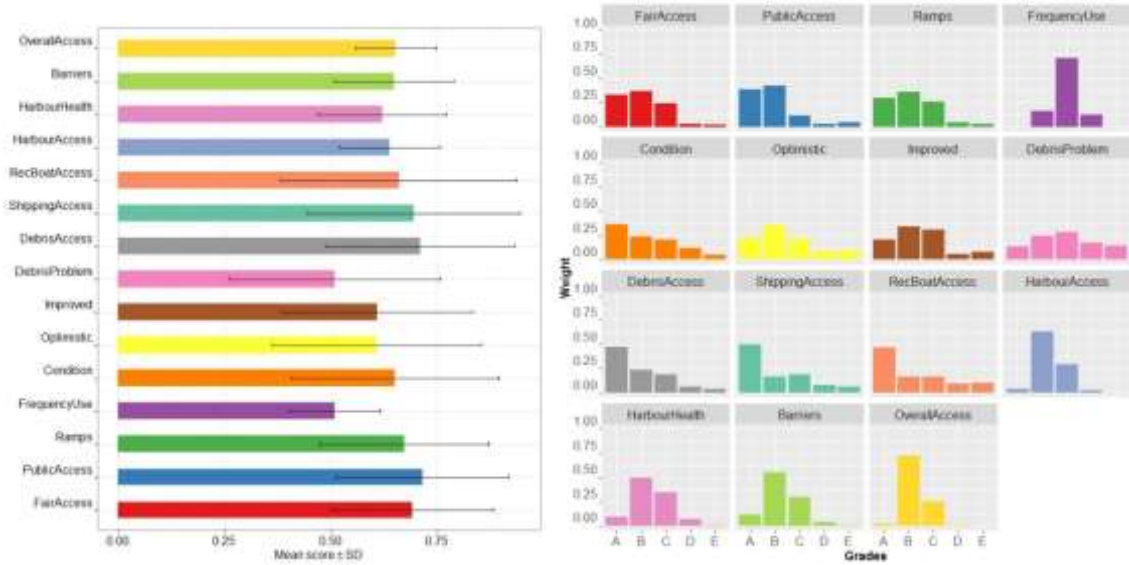


Figure 13c: Harbour access indicator group: Mean scores, standard deviations and A-E grade distribution for the overall indicator group, indicator and measures

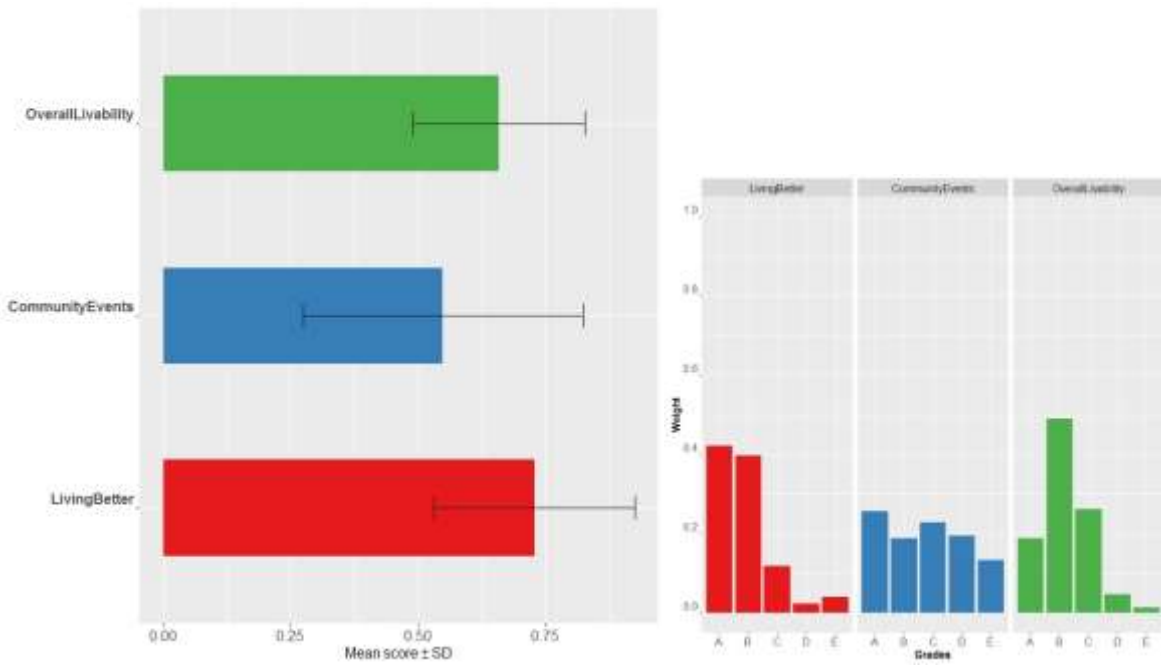


Figure 13d: Liveability and wellbeing indicator group: Mean scores, standard deviations and A-E grade distribution for the overall indicator group and indicators/measures

Figure 13 (a-d): 2016 Social component: Mean scores, standard deviations and A-E grade distribution

Cultural ('Sense of place') component details (Figure 14)

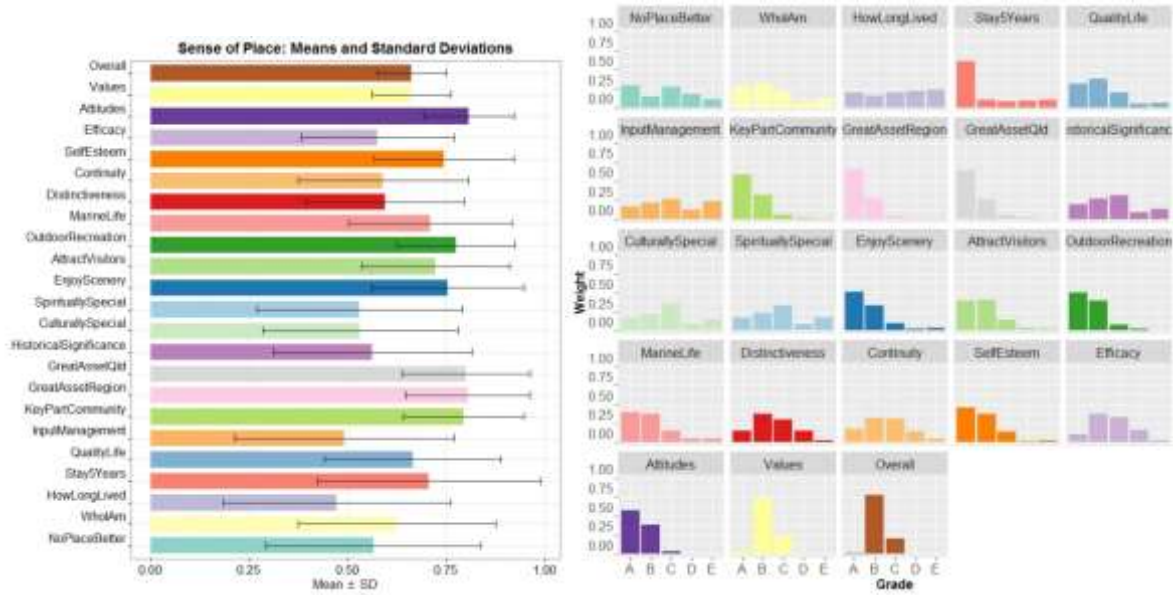


Figure 14: 2016 Cultural ('Sense of place') component: Mean scores, standard deviations and A-E grade distribution for the overall indicator group and indicators/measures

Economic component details (Figure 15a-d)

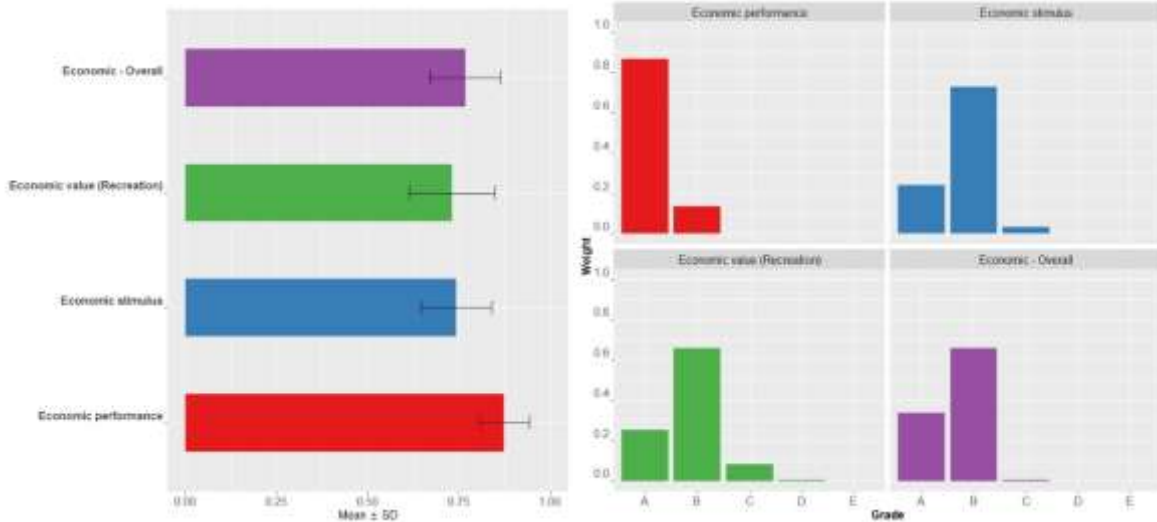


Figure 15a: Economic component: Mean scores, standard deviations and A-E grade distribution for the overall Economic component and indicator groups

Economic component details (Figure 15a-d)

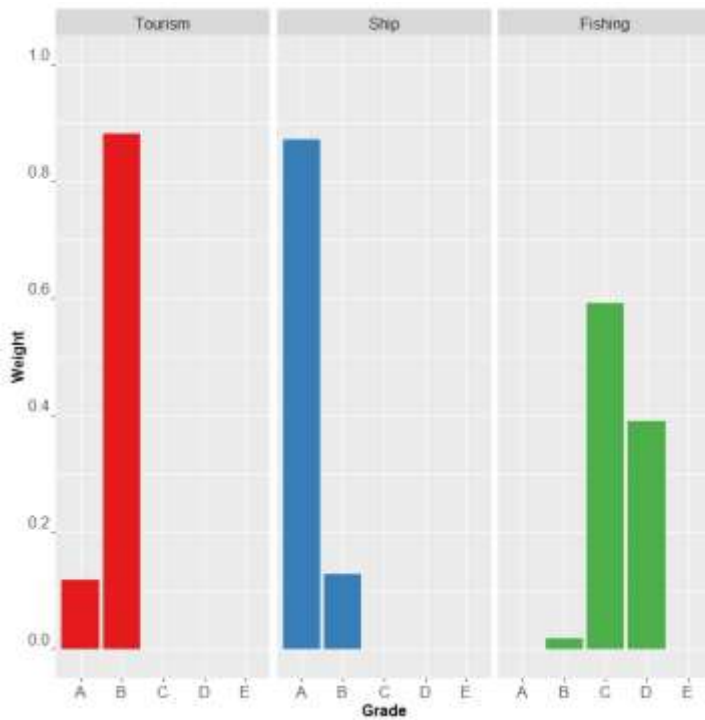


Figure 15b: Economic performance indicator group: A-E grade distribution for the three indicators

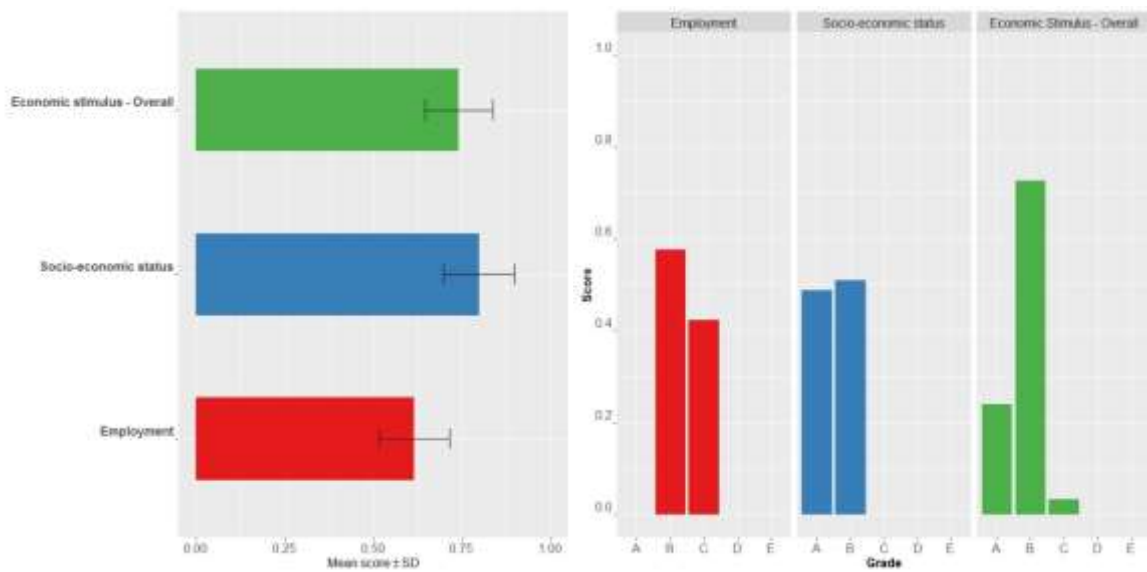


Figure 15c: Economic stimulus indicator group: Mean scores, standard deviations and A-E grade distribution for the overall indicator group and the indicators/measures

Economic component details (Figure 15a-d)

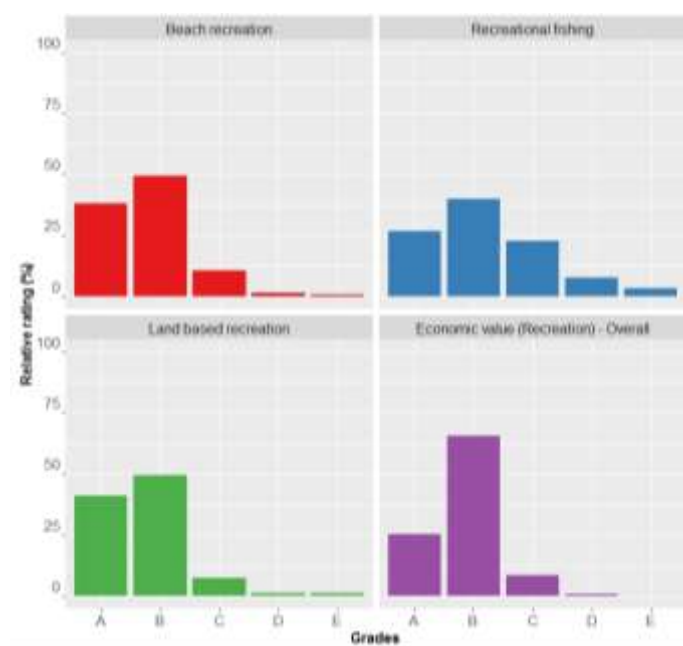


Figure 15d: Economic (recreation) value indicator group: A-E grade distribution for the overall indicator group and the indicators/measures

Figure 15(a-d): 2016 Economic component: Mean scores, standard deviations and A-E grade distribution

Four levels of assessment have been applied to evaluate the social, cultural and economic health of the Gladstone Harbour. At the highest level, all three components (Social, Cultural and Economic) achieve a B grade with the Economic component receiving the highest score (scores of 0.66, 0.66 and 0.75 respectively). There have been small increases in the scores for the Social and Cultural components in the past year (scores of 0.64 and 0.65 respectively in 2015), but the overall grade for the Social component improves from a C grade in 2015 to a B grade in 2016. While there has only been a two point increase in the overall component score, there has been a comprehensive improvement (albeit it small) in all the social indicators. There has been a small decrease in the score for the Economic component (score of 0.77 in 2015) but anomalies in data analysis confound the comparison.

At the second level of assessment, the indicator group, two of three indicator groups for the Social component have improved their grades. Both Harbour access and 'Liveability and wellbeing' have improved from a C grade in 2015 to a B grade in 2016. Harbour usability remains unchanged with a B grade. The 'Sense of place' indicator group for the Cultural component remains unchanged with a B grade. In the Economic component, the Economic performance indicator group improves from a B grade in 2015 to an A grade in 2016. The Economic stimulus and 'Economic (recreational) value' indicator groups remain unchanged with a B grade.

At the third level of assessment, there has been an improvement in the scores for all the social and cultural indicators, but only three have improved their grades, all improving from C grades in 2015 to B grades in 2016 ('Perceptions of barriers to access' and 'Liveability and wellbeing' (social indicators) and 'Values of the harbour' (cultural indicator)). Results for the economic indicators are more varied. There have been increases in the scores for Shipping activity, Tourism, Land-based and Beach recreation, but decreases in the scores for Commercial fishing, Employment, Socio-economic status and Recreational fishing. Shipping activity improved from a B grade to A grade and Tourism

improves from a C grade to B grade. Commercial fishing dropped from a C grade to a D grade and Socio-economic status dropped from an A grade to a B grade.

At the fourth level, fifty measures are evaluated. The only A grade scores (>0.85) are for the following measures:

- Social: Marine safety incidents
- Social: Oil spills
- Economic: Shipping activity (productivity)

There were no E grades, and the only D grade scores (0.25-0.49) are for the following measures:

- Social: Air quality satisfaction
- Cultural: How long lived in the area (proportional to age)
- Cultural: Input into management
- Economic: Line, Net and Trawl fisheries (productivity)

All 22 measures for the Social component have improved in the past year and all 17 measures for the Cultural component have either improved slightly or remained the same. There have been six gains and five losses in the 11 economic measures.

More notable improvements in scores (five points or more) are recorded for the following measures:

- Social: Shipping reduced my use
- Social: Oil spills
- Social: Condition of the harbour
- Social: Harbour condition improved over last 12 months
- Cultural: No better place to live
- Cultural: Plan to stay in the next five years
- Economic: Shipping activity
- Economic: Tourism expenditure
- Economic: Beach recreation

and notable decreases in the scores for the following economic measures:

- Index of economic resources
- Trawl fisheries
- Recreational fishing

There are some anomalies in the data analysis for commercial fishing which confound the ability to comment on the results or any trend analysis and no further comments are provided.

It can be challenging to identify the more important or significant changes and provide a reasonable explanation that is useful and not overly subjective. No information is collected in the CATI survey to explore the underlying reason or cause for any changes in attitudes that may have occurred. In some cases there has been a change in Grade which is a significant result, but there might have only been a one point increase in score from the previous year, making it hard to provide a meaningful explanation. This year there have been multiple small (one or two point) increases in the measures and indicators and it is not reasonable to provide further commentary on all of them.

However, there does appear to be an underlying pattern that usefully explains and connects some changes – the completion of the construction phase for many development projects. The community seems to be enjoying the harbour more than in the previous year and there have been improvements in both harbour usability and harbour access. There has been a clear improvement in community perceptions about the overall condition of the harbour. There is a perception that both water quality and the overall condition of the harbour have improved in the past year. As well, there is less impact of water quality on harbour usage. There are fewer reports of marine safety incidents

and the number of oil spills has declined. Perception of night time safety in the harbour area has also improved. People are using and enjoying the harbour more for recreational activity (beach and land-based, but not recreational fishing), providing more economic benefit for the community.

The end of the construction boom has also had some negative impacts on the socio-economic status of the community, with higher unemployment rates and less opportunities for higher income employment. However, there has been some offsetting benefit as the community has become less transient and more stable with people planning to remain in the area for more than five years. There have also been offsetting economic benefits in the tourism sector as some of the accommodation and other infrastructure bottlenecks seem to have been alleviated. There is an improved perception in the community that the harbour is attractive to visitors.

The increase in shipping activity associated with increasing LNG exports has strong economic benefits and there is no apparent evidence of any adverse social and cultural impacts. Overall, the distinctiveness of Gladstone as a good place to live has improved.

The other issue to note is the lack of identifiable change for some measures. There are some cases where there has been little or no change in the score of measures from 2014, particularly in the cultural component. It is not clear whether this is because there has not been much change in community attitudes or whether the measures themselves and process of elicitation (a telephone survey) are not sufficiently sensitive to detect any changes. In the 2014 report, some sensitivity testing was conducted that identified the measures with a low contribution to the overall score. However, the authors justified the retention of these measures by outlining the relative importance of their cumulative effect and as explanatory variables in their own right. There appears to be no convincing argument at this stage to remove any of the social and cultural measures.

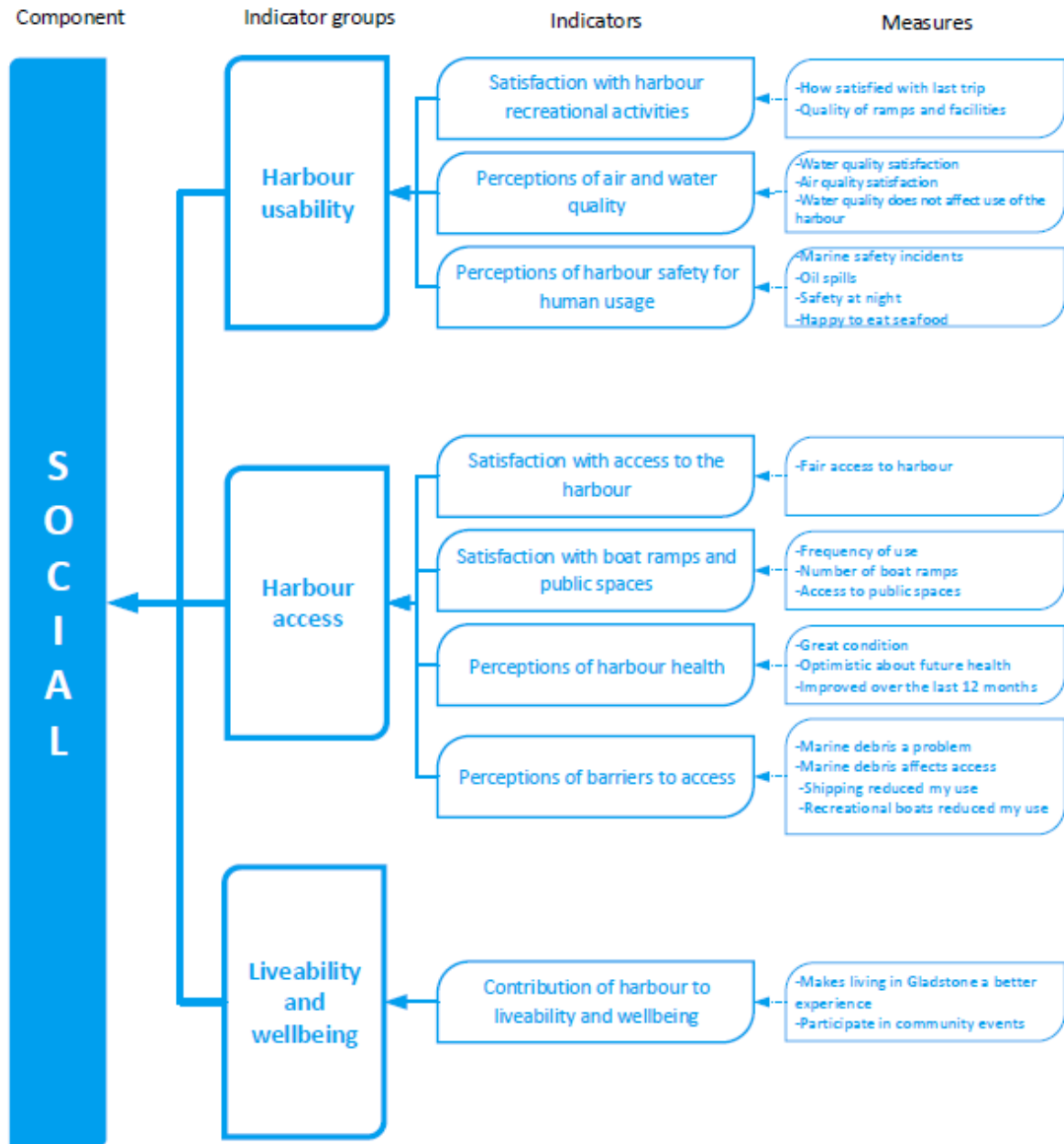
The measures applied in the Economic component are more limited as they do not provide a robust overview of the economic health of the area. In many respects this is due to a lack of readily available and annually updated data sets. This has been an ongoing problem in the evolution of the report card and some suggestions are provided in the future recommendations (Appendix E).

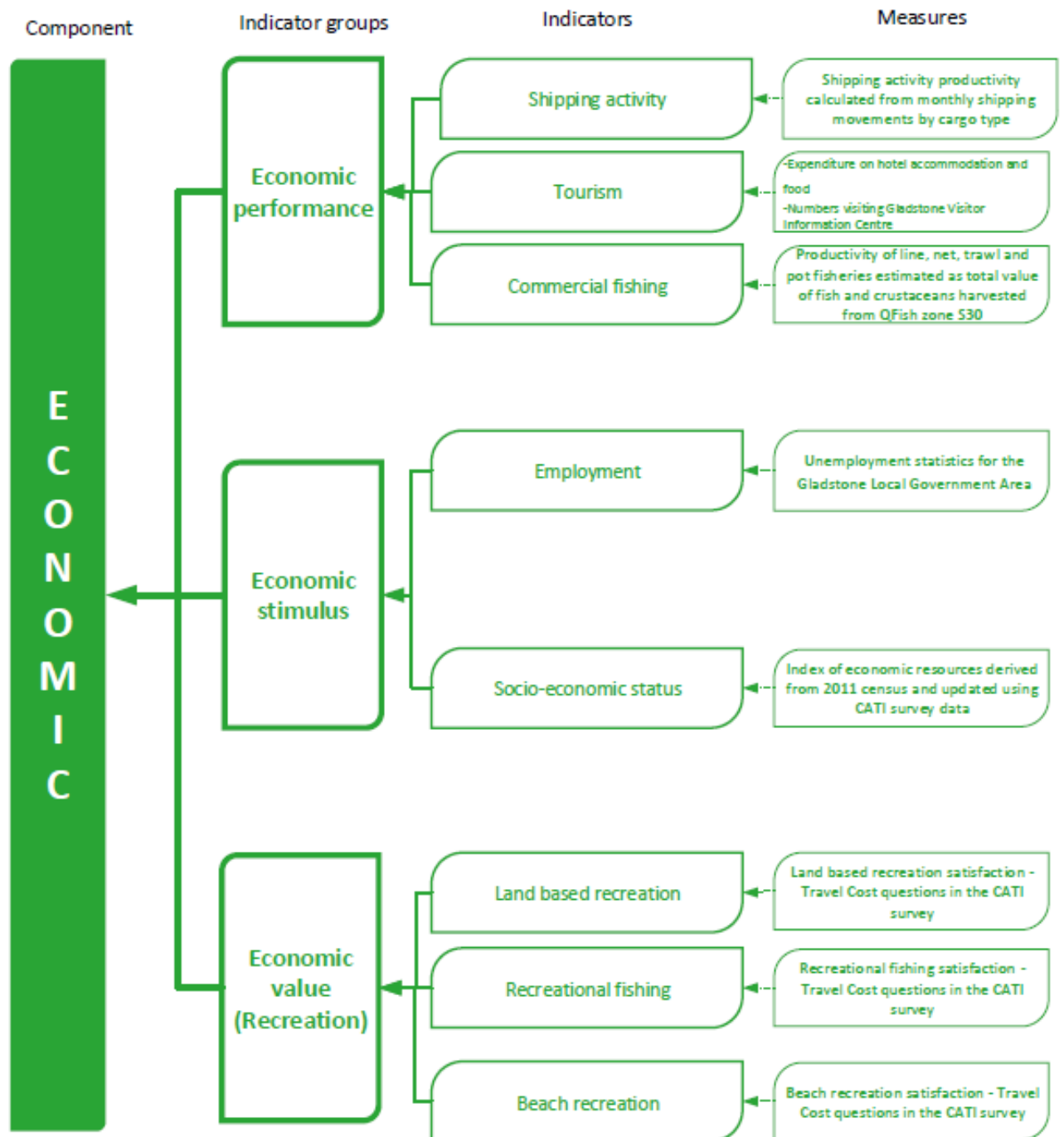
In conclusion, it is apparent that there have been some comprehensive improvements in social, cultural and economic health of the community, albeit it with some decline in the socio-economic status of the community. Some of the measures applied in the report card have been robust in detecting change in the community health within a 12 month period which is an encouraging result.

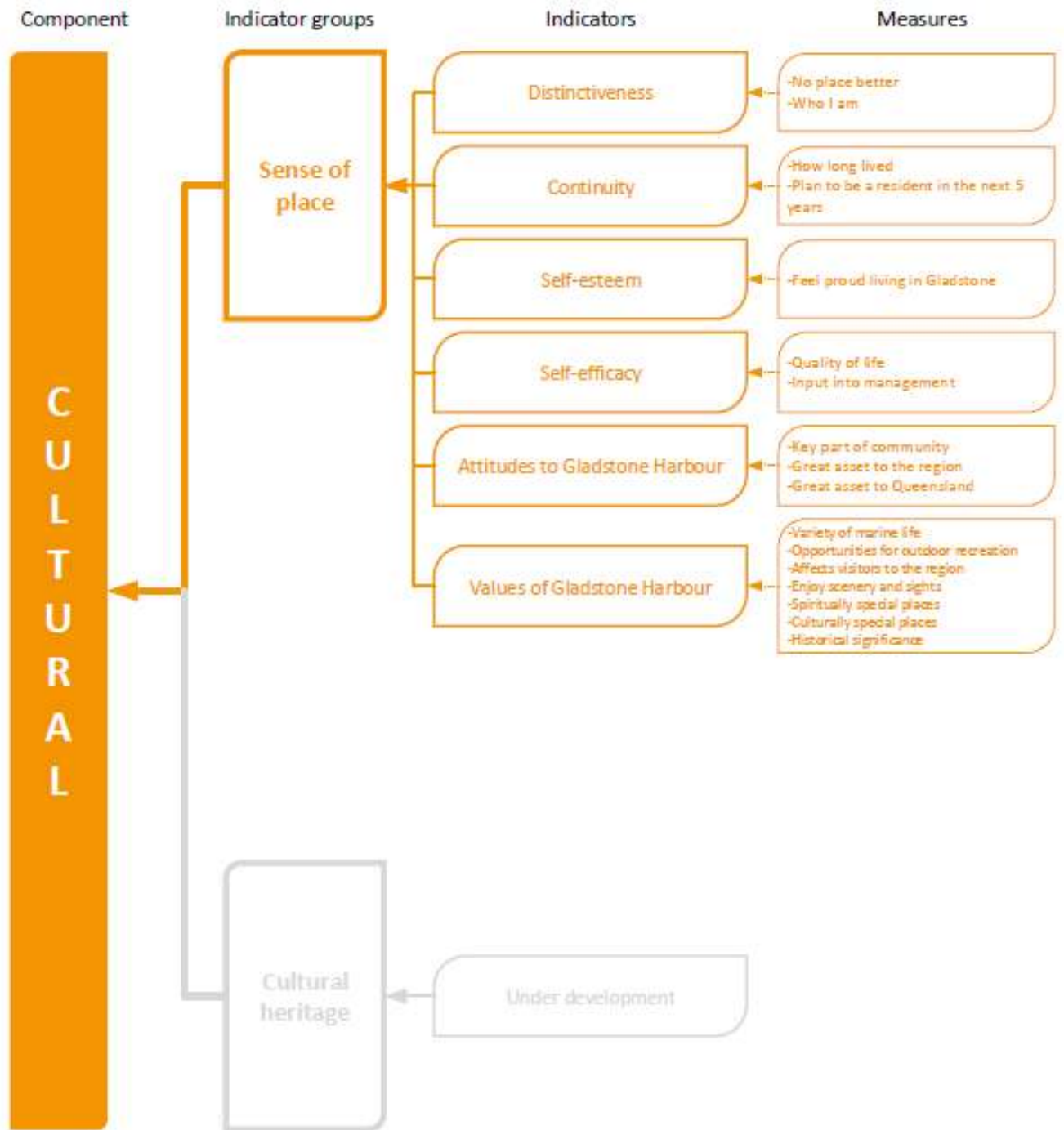
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Appendix A: Social, cultural and economic assessment criteria







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

Q7a. When you think of the reason for your greater or less recreational activity in Gladstone Harbour, what two or three words come into your mind

_____ (exclude uninformative words e.g. the, it, like, well and plural words BUT accept 2 words or three word string but add '-' to end of first word)

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

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	
Shore-based fishing	
Relaxing by the water	
Sporting events	
Community events	
Another shore-based activity	
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 slightly unsatisfied	Very slightly satisfied				Very satisfied
1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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	
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(please retain the same survey question number to allow for easier comparison with previous surveys)

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

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

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				Very	Very				Strongly	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											

	Strongly				Very	Very				Strongly	No
Q28a. I am satisfied with facilities associated with boat ramps in the Gladstone Harbour area											
Q29. I have fair access to Gladstone Harbour compared to other users of the harbour											
Q30. There are other places that are better than the Gladstone Harbour area for the recreational activities that I do											
Q32. The amount of recreational boating activity in Gladstone Harbour has reduced my use of the area											
Q31. The amount of commercial shipping in Gladstone Harbour has reduced my use of the area											

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

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

With 1=strongly disagree to 10=strongly agree	Strongly				Very	Very				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											

With 1=strongly disagree to 10=strongly agree	Strongly				Very	Very				Strongly	No
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				Very slightly	Very slightly				Strongly	No Answer
	1	2	3	4	5	6	7	8	9	10	
Q40. I think water quality in Gladstone Harbour is in good condition											
Q41..I think air quality in Gladstone Harbour is in good condition											
Q42. The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months											
Q43. I would be happy to eat seafood caught in the Gladstone Harbour area											
Q44. I feel safe being in the Gladstone Harbour area at night											
Q45. Gladstone Harbour makes living in Gladstone a better experience											
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				Very slightly	Very slightly				Strongly	No Answer
	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											
Q48. I believe the traditional sites and customs in the Gladstone Harbour area are well protected											
Q49. I believe the Traditional Owners of the Gladstone Harbour area are well consulted by the regional managers											

With 1=strongly disagree to 10=strongly agree	Strongly				Very slightly	Very slightly				Strongly	No Answer
	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				Very	Very				Agree	No
	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+
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q65. Are you male or female?

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

Q67. What is your approximate household income?

Weekly	≤\$399	\$400 - \$799	\$800 - \$1249	\$1250 - \$1499	\$1500 - \$1999	\$2000 - \$2499	\$2500 - \$2999	≥\$3000
Annual	≤\$20,799	\$20,800- \$41,599	\$41,600- \$64,999	\$65,000- \$77,999	\$78,000- \$103,999	\$104,000- \$129,999	\$130,000- \$155,999	≥\$156,000
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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

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

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

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

Q73. Is your home:

Owned with a mortgage?	Owned without a mortgage?	Rented?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q73a. If owned with a mortgage, is your mortgage repayment greater than \$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 e 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 and baseline scores for social and cultural measures

C1 Social component

Three social indicator groups were examined within the CATI survey; Harbour usability, Harbour access and, Liveability and wellbeing. Each of these indicator groups is examined in turn below.

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 indicator are presented below.

C1.1.1 Satisfaction with harbour recreational activities

Respondents indicated overall level of satisfaction on a 10 point scale (1=Very unsatisfied to 10=Very satisfied) for 'last beach trip' (mean 8.12, SE 0.1), 'last shore-based recreation trip' (mean 8.22, SE 0.1) and 'last fishing trip' (mean 7.15, SE 0.2). Across all three questions the majority of respondents indicated being satisfied with their last trip with the distribution of responses shown in Figure C1.1.

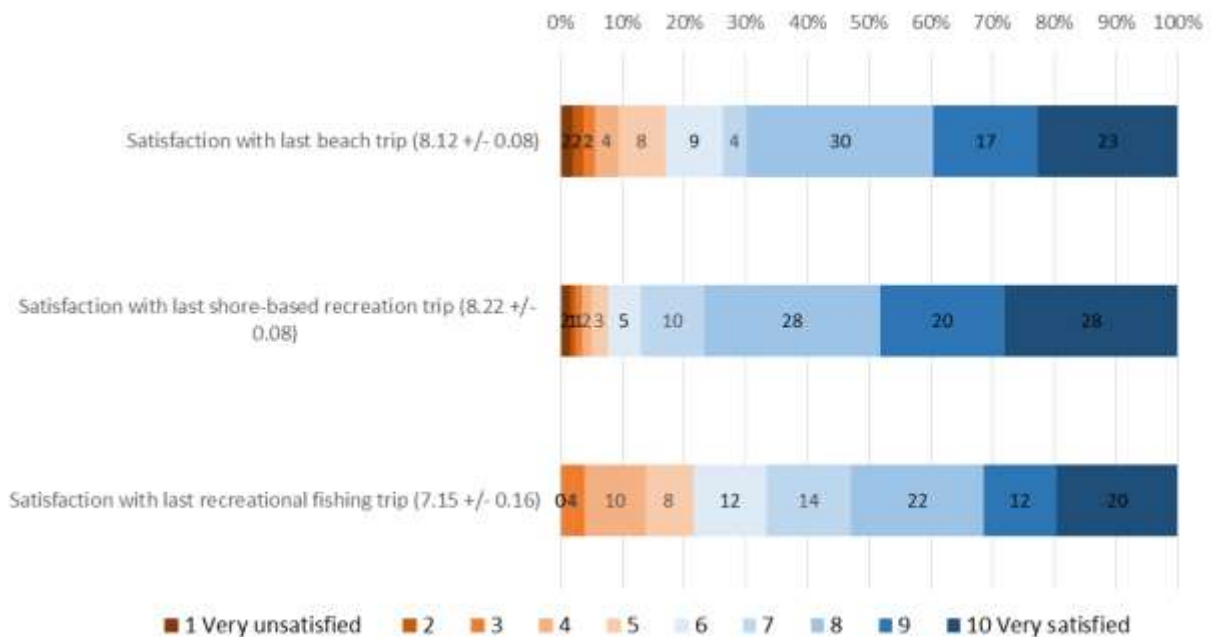


Figure C1.1: Satisfaction with last beach, shore-based, and recreational fishing trip in Gladstone Harbour area

Male respondents indicated significantly lower average satisfaction for 'last beach trip' (7.98 vs 8.32, $p=0.016$), 'last shore-based recreation trip' (8.01 vs 8.44, $p=0.010$) and 'last fishing trip' (6.83 vs 7.76, $p=0.006$). There was no significant difference in satisfaction by boat ownership ($p>0.05$) although boat owners tended to have lower averages across all three types of recreational activity. There was

also a significant difference in satisfaction with ‘last beach trip’ ($F(17,367)=1.740, p=0.035$) by location with further examination of post hoc tests indicating that the difference was primarily driven by respondents in two locations namely Benaraby ($n=15, 4%$) and West Gladstone ($n=26, 7%$) who indicated significantly lower satisfaction than respondents from other locations. Comparisons between mean scores for these CATI questions for the current sample and in 2015 (using one sample t test and 0.05 level) indicate significant improvement in satisfaction relating to ‘last beach trip’ (2016 - 8.12 vs 2015) and ‘last shore-based recreation trip’ (2016 – 8.22 vs 2015 – 7.89). There was however a significant decrease in satisfaction with ‘last fishing trip’ (2016 – 7.15 vs 2015 – 7.72).

Satisfaction with the quality of boat ramps in the harbour area was high (mean 7.37 SE 0.1), satisfaction with the facilities offered at the boat ramps was slightly lower but still high (mean 7.15 SE 0.1), see Figure C1.2. Respondents who owned a boat indicated significantly higher satisfaction with the quality of ramps than non-owners (7.69 vs 7.18). Interestingly, as for satisfaction with recreational trips generally, gender played a significant role with males indicating higher average satisfaction with both ramp quality (7.65 vs 7.08) and with the facilities offered at boat ramps (7.35 vs 6.91). Location (of respondent) proved to have no effect.

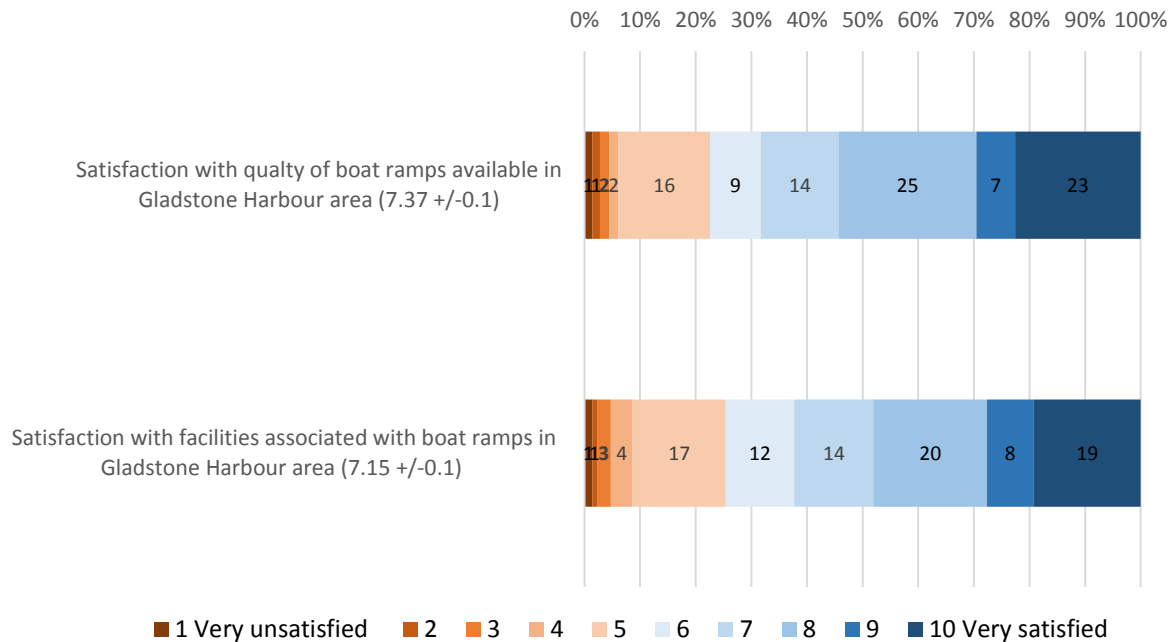


Figure C1.2: Satisfaction with the quality of boat ramps and the facilities associated with these ramps in the Gladstone Harbour area

C1.1.2 Perceptions of air and water quality

Opinion of air and water quality was 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 7.08 SE 0.1), overall satisfaction with water quality was moderate (mean 6.15 SE 0.1) while opinion of air quality was comparatively low (mean 4.93 SE 0.1). Clustering of

responses across the three measures are presented in Figure C1.3. Ratings of air/water quality and water quality on use of harbour were independent of gender, boat ownership and length of time living in the region. There was however a significant difference in rating of air quality by location ($F(17,392)=2.402, p = 0.002$). Further examination of mean difference and post hoc tests indicated that the difference was primarily driven by respondents in three locations namely Barney Point ($n=5, 1\%$), Benaraby ($n=16, 8\%$) and Clinton ($n=37, 9\%$) who rated air quality significantly lower than respondents from other locations.

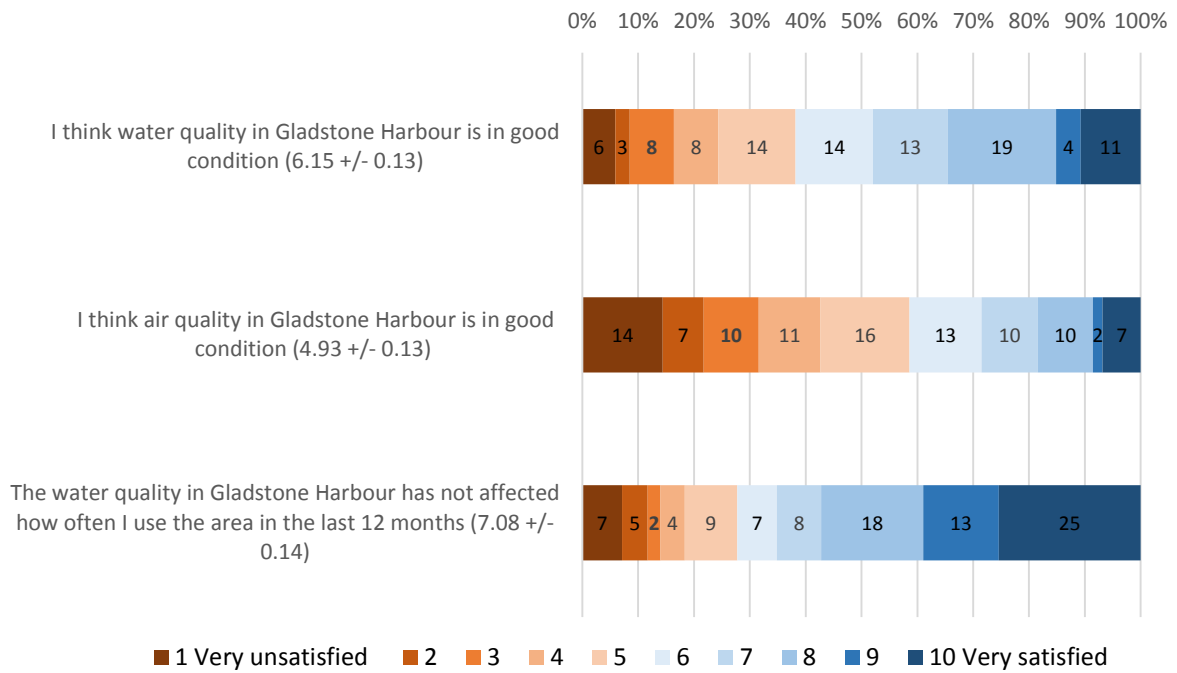


Figure C1.3: Opinion of air and water quality in Gladstone Harbour and effect this has had on frequency of visits in the past 12 months

C1.1.3 Perceptions of harbour safety for human usage

Presented in Figure C1.4 are the spread 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’. Male respondents agreed significantly more with both the safety (7.29 vs 6.33) and eating seafood from the harbour (7.01 vs 6.19) questions, while boat ownership, length of time living in the Gladstone Harbour area and location had no impact on responses.

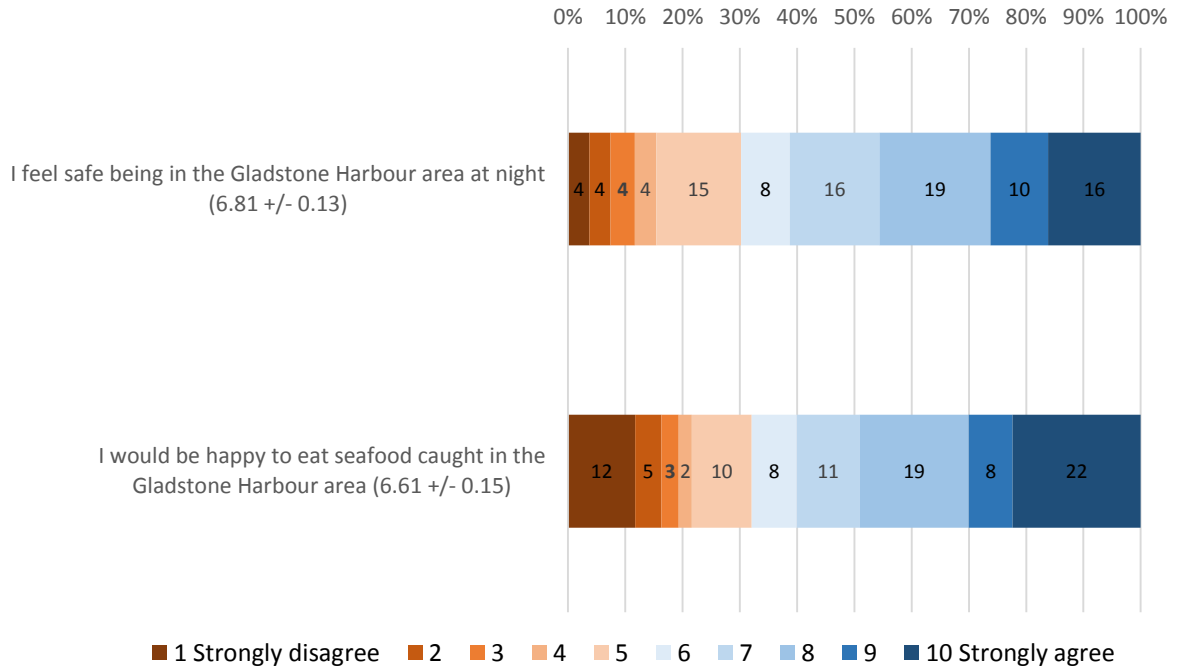


Figure C1.4: Endorsement of feeling safe in the Gladstone Harbour area at night and acceptability of eating seafood caught in the Gladstone Harbour area

C1.2 Harbour Access

Harbour access was assessed across four indicators; Satisfaction with access to the harbour (CATI questions 29 and 47), 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 7.5, SE 0.1).

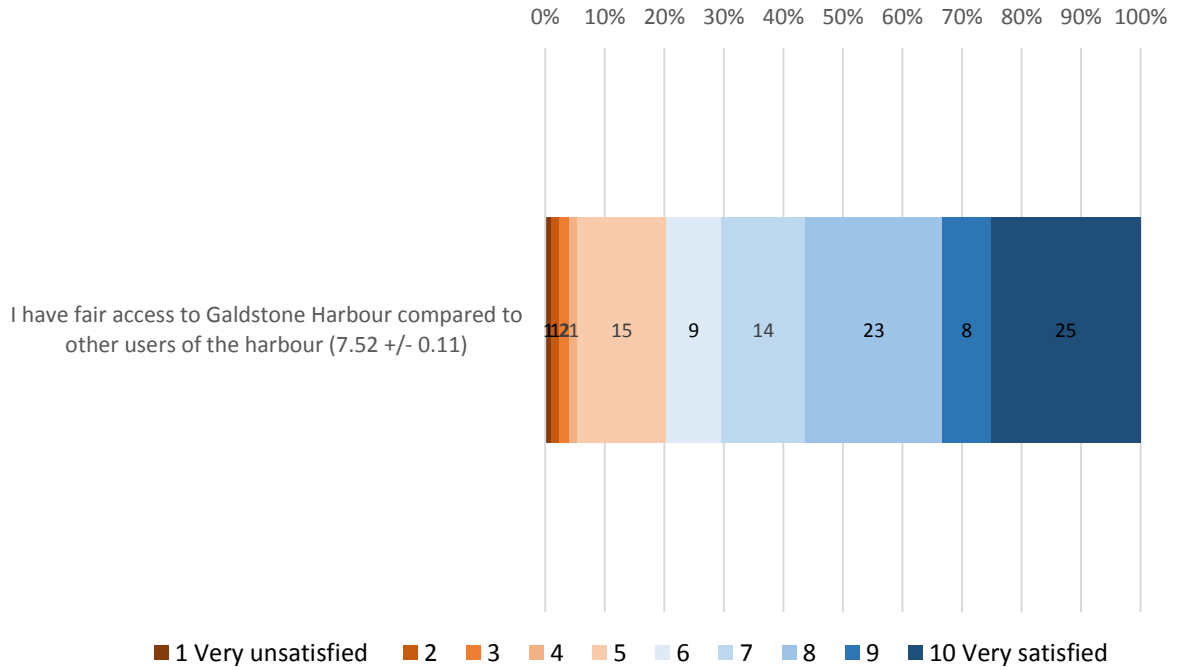


Figure C1.5: Perceptions of fair access to Gladstone Harbour

C1.2.2 Satisfaction with boat ramps and public spaces

Frequency of boat ramp use in the past 12 months is presented in Figure C1.6. The majority of respondents had never used a boat ramp (59%), but the average use by the 41% who had used the ramps was 19.5 times a year. Across the full sample, the average use was eight times per year. (The same category averages were applied as presented in Table 5 in the recreational reactivity results section).

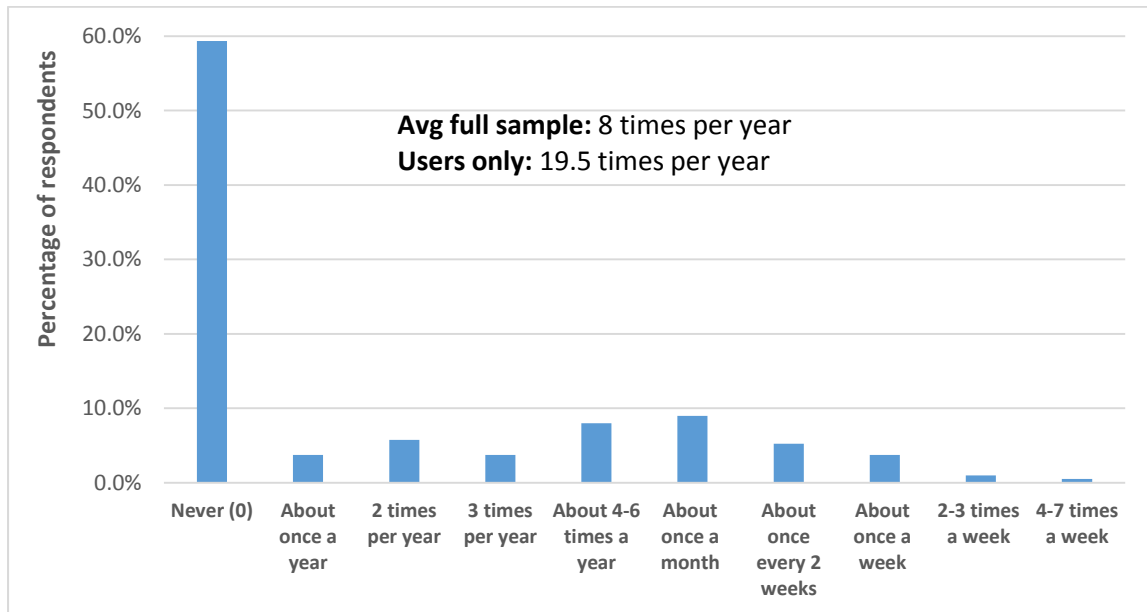


Figure C1.6: Frequency of Gladstone Harbour area boat ramp use in the past 12 months

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). Gender again proved a significant variable with males being more satisfied with the number of ramps available (7.52 vs 7.06, $p=0.043$) than females, while females were more satisfied with access to public spaces (7.51 vs 7.95, $p=0.044$) than males. Boat ownership did not affect satisfaction with the number of ramps available, but it did prove significant in regards to access to public spaces with those without a boat indicating significantly higher satisfaction (7.96 vs 7.33, $p= 0.010$). There was also a significant difference in satisfaction with access to public spaces by location ($F(17,374)=1.808$, $p = 0.025$), further examination of post hoc tests indicated that the difference was primarily driven by respondents in two locations namely Calliope ($n=41$, 10%) and West Gladstone ($n=30$, 8%) who had significantly lower satisfaction than respondents from other locations.

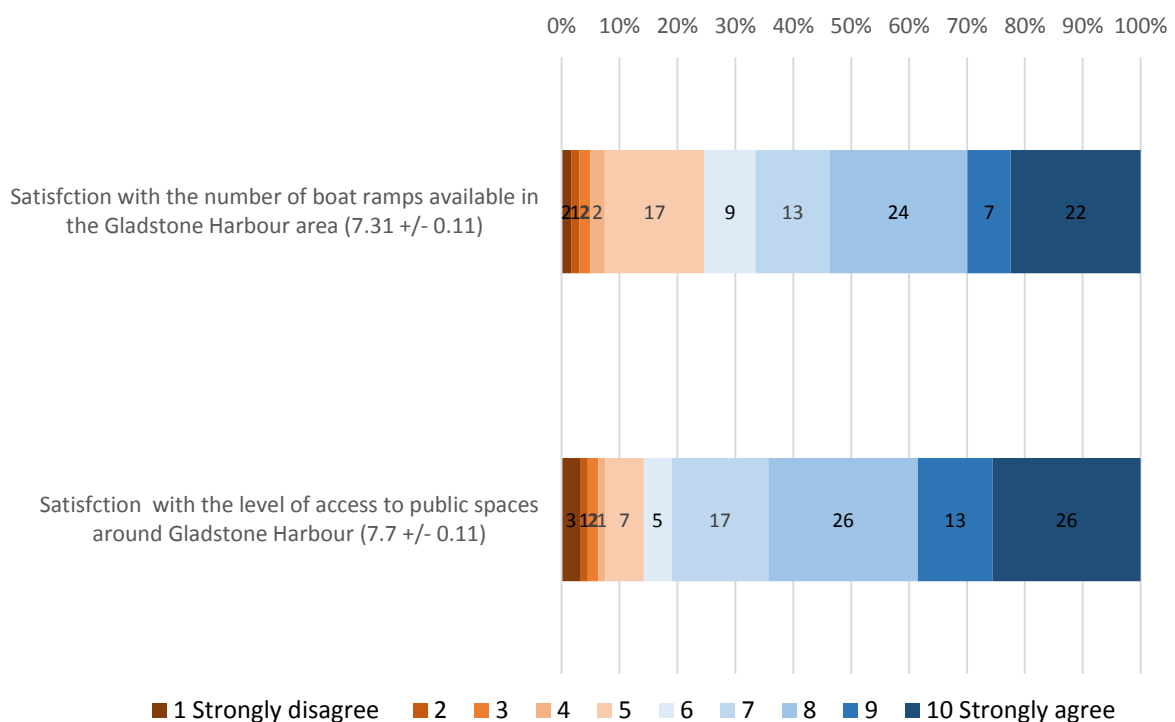


Figure C1.7: Satisfaction with number of ramps and access to public spaces within the Gladstone Harbour area

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 7.07, SE 0.1), their level of optimism for the future health of the harbour (mean 6.59, SE 0.1) and whether they thought the health of the harbour had improved over the past 12 months (mean 6.58, SE 0.1). 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 36 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. Gender, boat ownership, location and length of residence in the Gladstone area all proved to have no impact on perceptions of harbour health.

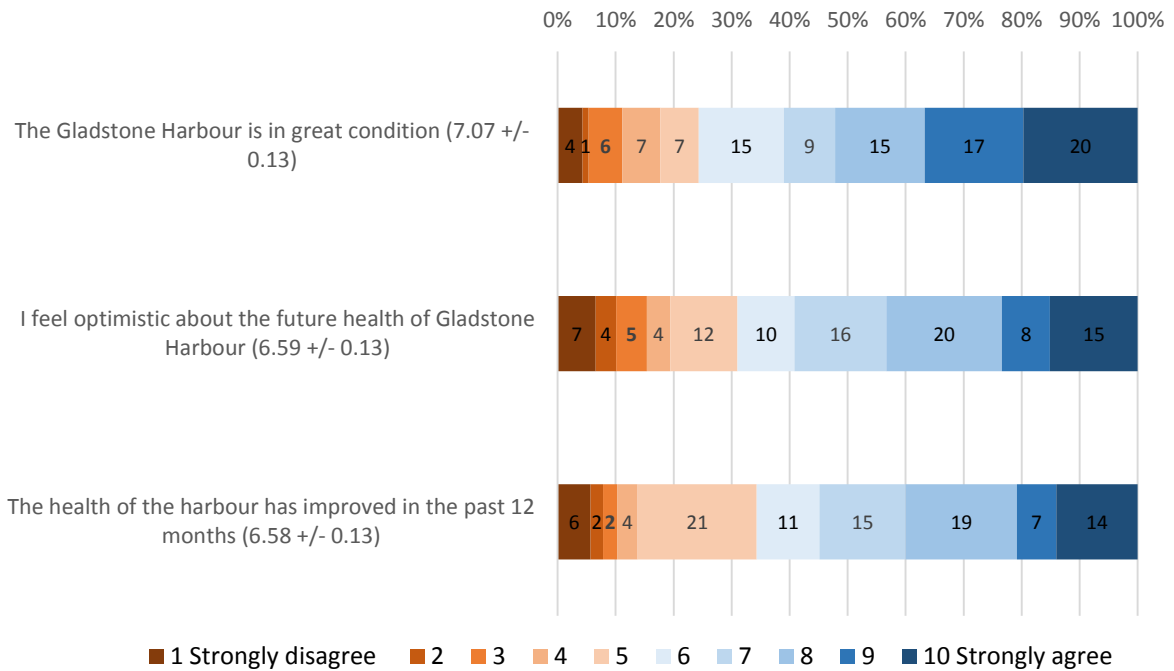


Figure C1.8: Perceptions of Gladstone Harbour condition, levels of optimism about future health of the harbour and perception of improvements over last 12 months

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. Boat ownership proved to have a significant effect on response to the statement regarding the impact of recreational boating on access to the harbour with those owning a boat indicating significantly stronger agreement (4.15 vs 3.49). Location, gender and length of residence in Gladstone proved to have no effect on any of the four questions.

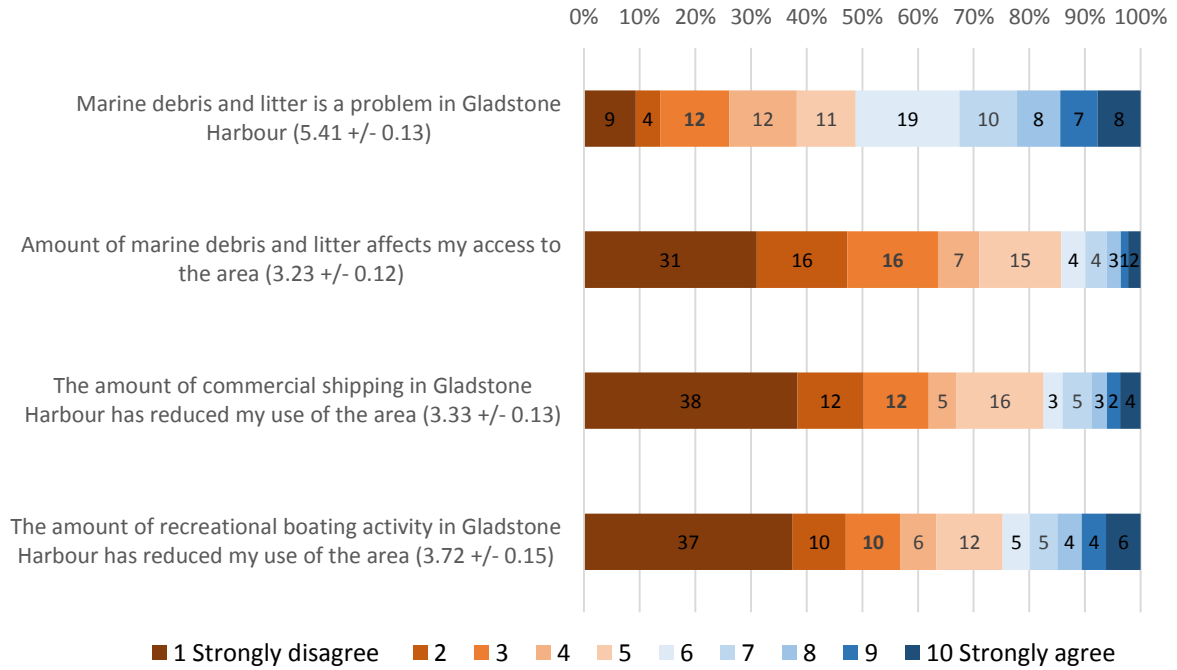


Figure C1.9: Agreement with statements regarding the effect of marine debris and litter, and levels of shipping and recreational boating on harbour accessibility

C1.3 Liveability and wellbeing

Liveability and wellbeing was assessed through one indicator (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 but relatively low endorsement of participation in community events in the area. Gender, location, length of time residing in the area and boat ownership were all found to have no significant effect on ratings in this indicator.

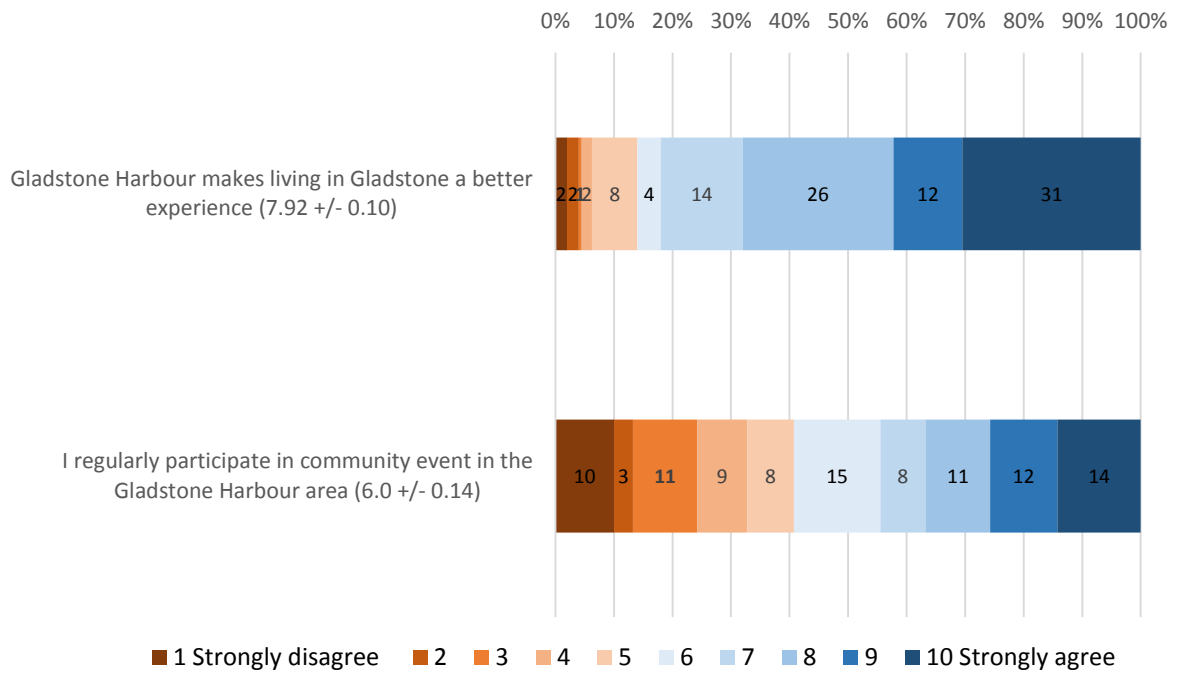


Figure C1.10: Contribution of harbour to liveability: experience and participation in community events

C2 Cultural component: Sense of place indicator group

Only one indicator group, Sense of place, is assessed in this project for the cultural component. There were six indicators assessed via CATI questions (measures)

- 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.

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.

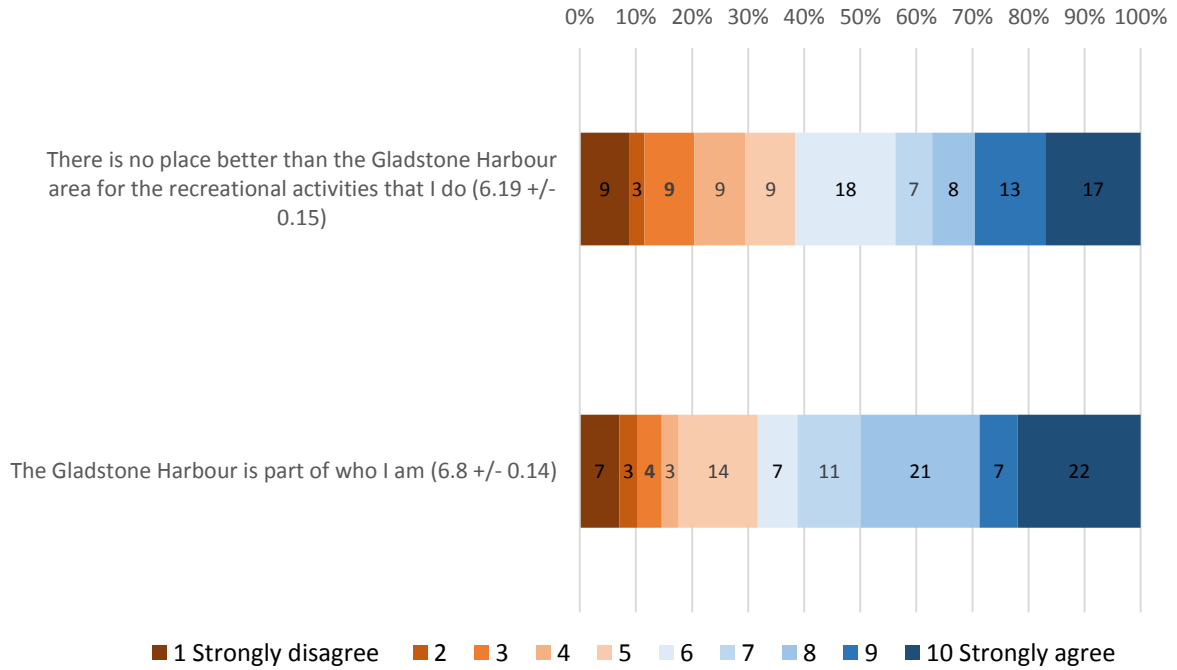


Figure C2.1: Measures of distinctiveness

Both boat owners and males indicated lower agreement to the statement ‘There is no place better ... for the recreational activities that I do’ (5.69 vs 6.47 and 5.70 vs 6.68 respectively). Placing this findings in context while males were statistically more likely to report owning a boat ($\chi^2=3.911$, $p=0.048$) in the sample overall, the between gender and boat ownership on ‘There is no place better ...’ failed to reach statistical significance ($p>0.05$). Identification as a Traditional Owner, length of residence in the Gladstone area (or the location of this residence) failed to affect agreement with ‘There is no place better ...’.

In regards to the harbour area being part of ‘Who I am’ gender and location proved to have no significant effect on ratings. Individuals who identified as Traditional Owners agreed with the statement significantly more strongly than those who did not so identify (7.80 vs 6.68, $p=0.010$); those who owned a boat (7.16 vs 6.60) also agreed more strongly that the Gladstone Harbour area was part of their identity. Agreement with this statement also increased almost linearly with increasing length of residence in the Gladstone area ($F(5,396)=4.878$, $p=0.000$), however while there was a higher percentage of boat ownership in the longest residence categories (40-49 and 50+ years) the interaction proved to be non-significant ($\chi^2=3.315$, $p>0.05$).

C2.2 Continuity

Time spent living in the Gladstone Harbour region ranged from less than a year (minimum 2 months) through to 90 years (average 26 years, mode 40 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 10-19 year cohort.

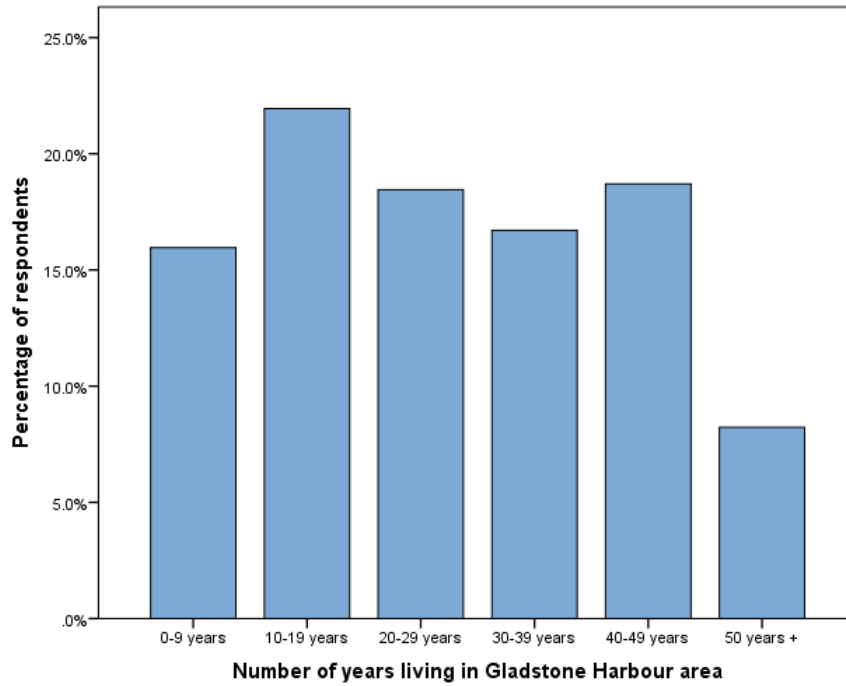


Figure C2.2: Time spent living in the Gladstone Harbour area

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.

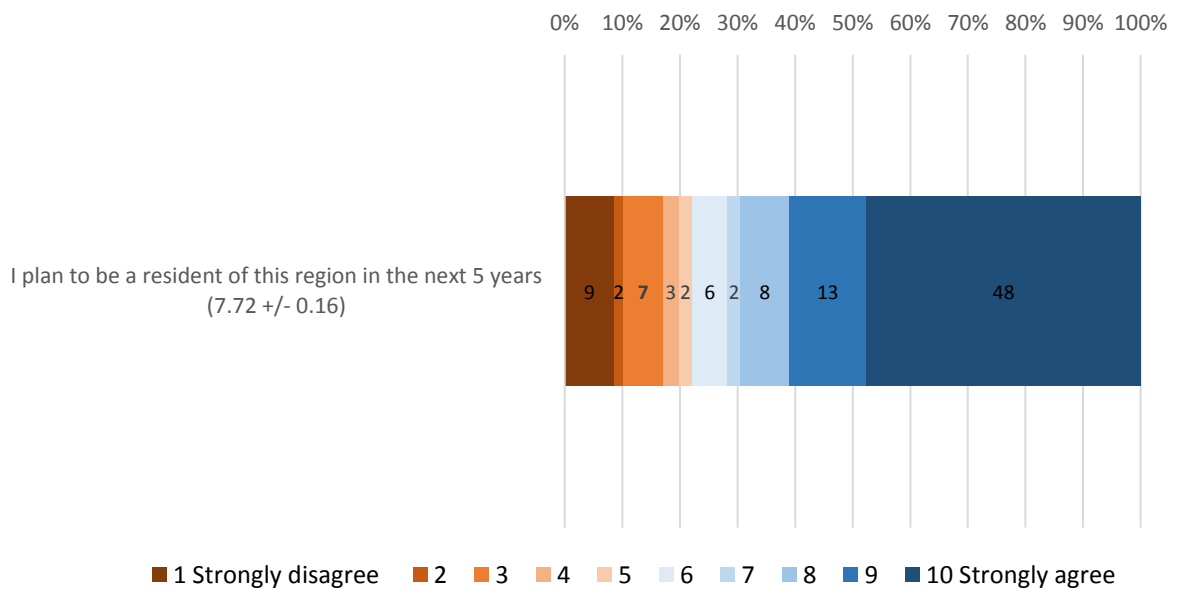


Figure C2.3: Intention to remain in the Gladstone Harbour area for the next 5 years

Intention to remain in the Gladstone Harbour area in the immediate future was not dependent on length of time residing in the area, locality, gender, boat ownership or identification as a Traditional Owner.

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, as can be seen there is a strong skew towards 'Strongly agree' with a high average endorsement (~8.0). Interestingly there was a moderate significant correlation ($r=0.33$) between this Self-esteem measure and intention to remain in the area for the next 5 years, suggesting that those who feel proud to be living in Gladstone also intend to stay in the area for the immediate future). Boat ownership, location and gender all proved to have no significant effect on self-esteem (although gender approached significance $p=0.058$, male=7.89, female=8.26). Agreement with the statement increased almost linearly with increasing time spent living in the Gladstone area ($F(5,400)=5.773$, $p=0.000$). Agreement was also significantly higher for those identifying as Traditional Owners (8.68 vs 8.00, $p=0.026$).

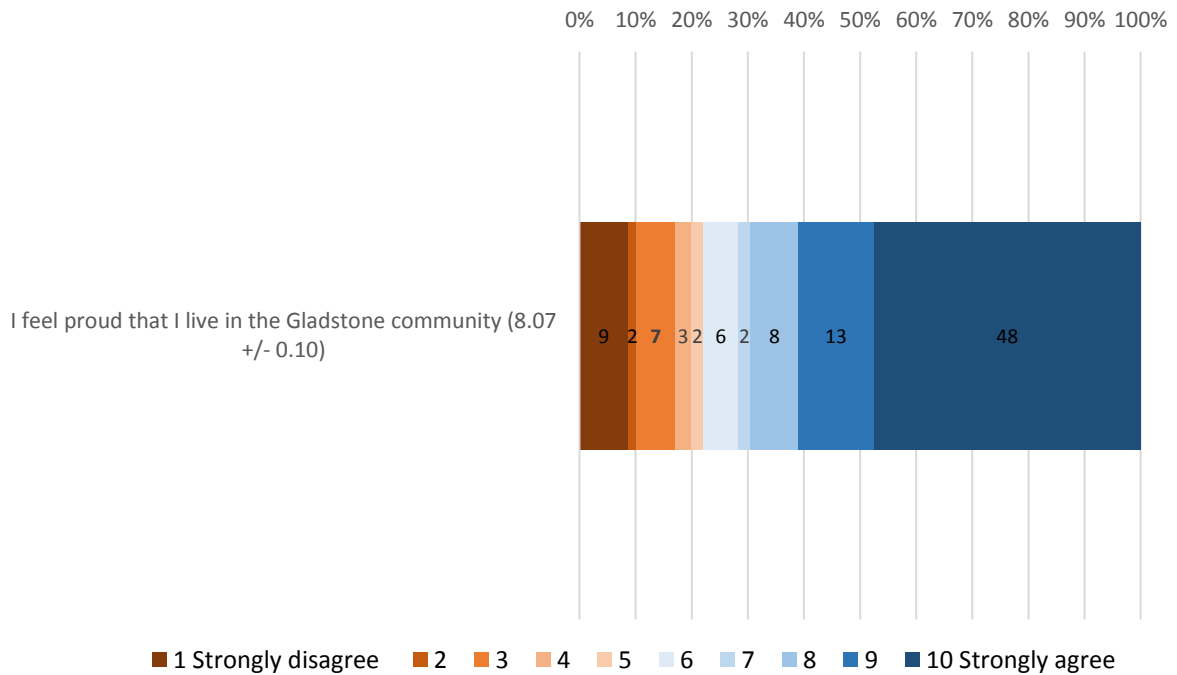


Figure C2.4: Measure of Self-esteem

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) highlighting the positive effect of the area on respondent quality of life. There was no significant difference in scores by gender, boat ownership, length and/or place of residence and identification as a Traditional Owner all had no significant effect on responses to this question.

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). There was no significant difference in scores by gender, boat ownership or place of residence. However years spent living in the Gladstone Harbour area did significantly interact with endorsement of this measure ($F(67,386)=1.364, p=0.042$) with significantly lower scores (i.e., great levels of disagreement) tending to come from those who have lived in the area for longer than 25 years. In addition, those who identified as a Traditional Owner of the area endorsed the ability to have input into the management of the harbour significantly more than those who did not identify as a Traditional Owner (6.59 vs 5.17, $p=0.002$).

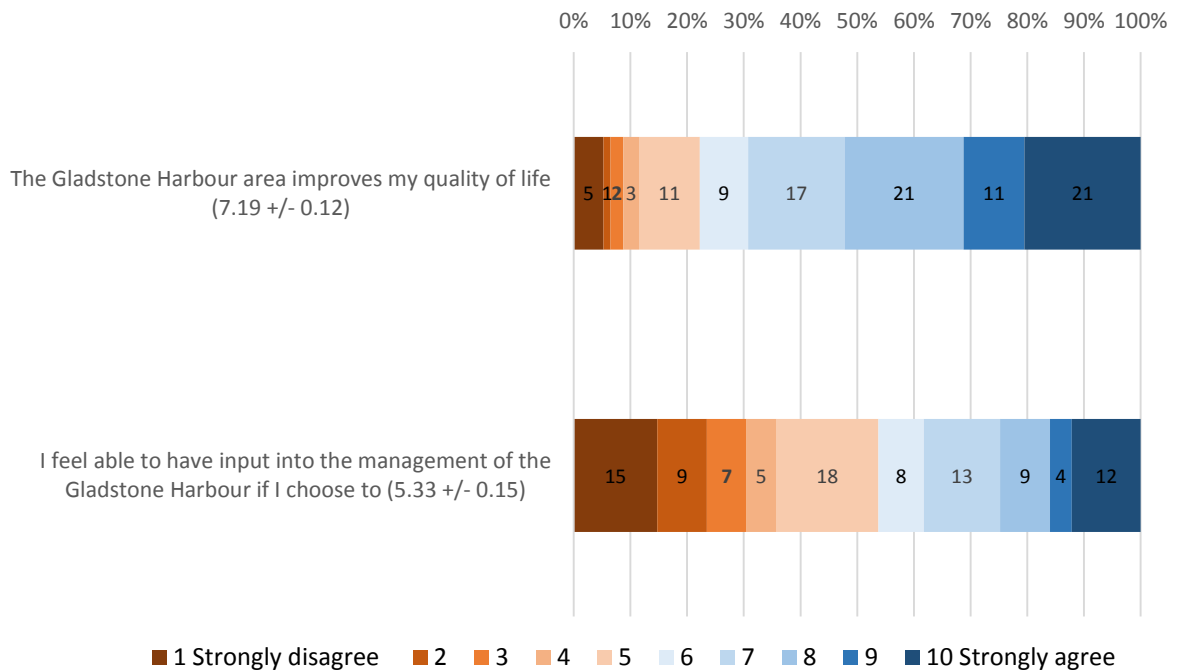


Figure C2.5: Measures of Self-efficacy

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 8.63), that it is a great asset to the local regional economy (8.70) and a great asset to the State economy (8.67). This positive endorsement did not differ by gender, boat ownership, location or identification as a Traditional Owner. Length of time residing in the area (using residence length category as shown in Figure 14) proved to significantly affect endorsement of the harbour contribution to the local economy ($F(5,400)=6.325, p=0.000$) and state economy ($F(5,398)=5.234, p=0.000$). Post hoc testing (Games-Howell given unequal variances) showed that this was due to differences between the 40-49 and 50+ years of residence cohorts and all other categories. Those with the longest time resident in Gladstone more strongly agreed with the importance of the area for the local and state economy.

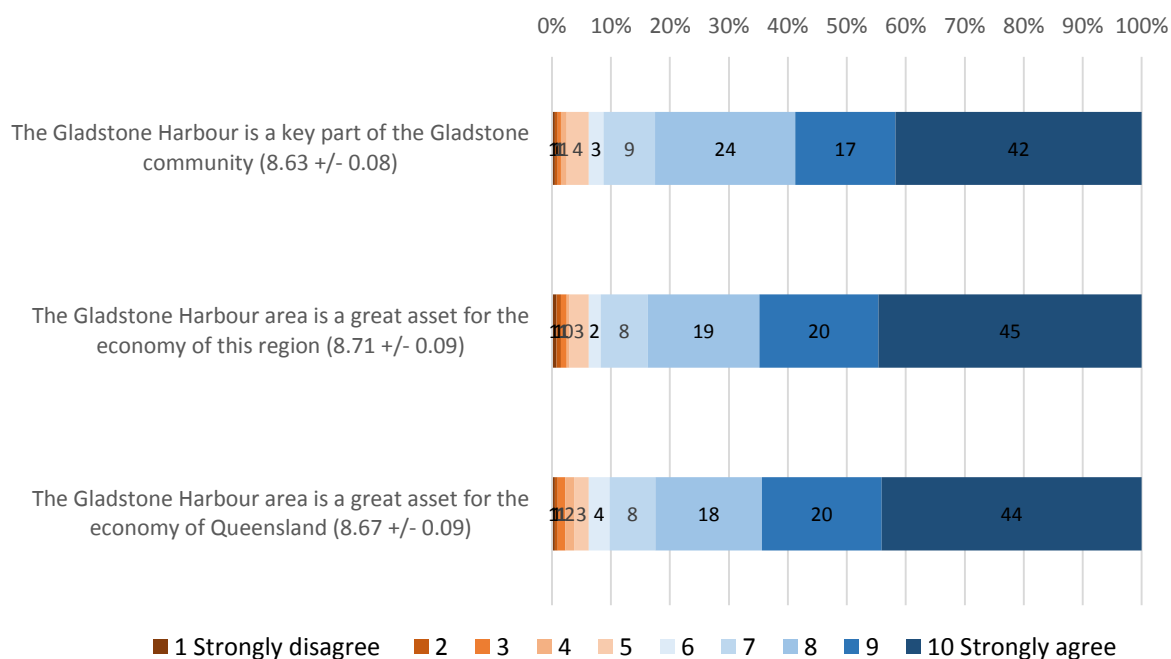


Figure C2.6: Measures of Attitudes to Gladstone Harbour

C2.6 Values of Gladstone Harbour

Respondents were asked to indicate how strongly they agree with six 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 7.7]; opportunities for outdoor recreation [mean 8.42]; attracts visitors to the region [7.84]; scenery and sights [8.21]) 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 [5.77]; culturally special places [5.79] and historical significance [6.13]).

Gender effects were observed across most of the value statements with males indicating less agreement with/value of ‘attracting visitors to the region’ (7.58 vs 8.10, $p=0.011$); ‘scenery and sights’ (7.91 vs 8.52, $p=0.002$); ‘spiritually special places’ (5.17 vs 6.36, $p=0.000$); ‘culturally special places’ (5.18 vs 6.39, $p=0.000$) and ‘historical significance’ (5.68 vs 6.58, $p=0.001$). Similarly, significant differences were noted as a function of length of residence (categorised as per Figure 14) across all questions except question 62 (‘culturally special places’) where there was no difference. For each value longer term residents (40-49 and 50+ years) indicated significantly stronger agreement than those who had been resident for less time. Those who identified as a Traditional Owner of the area showed significantly higher endorsement of the measures presenting the personal value of ‘spiritually special places’ (7.30 vs 5.58, $p=0.000$), ‘culturally special places’ (7.27 vs 5.60, $p=0.000$) and ‘historical significance’ (7.73 vs 5.93, $p=0.000$). In contrast, boat ownership and location of residence proved to have no significant impact on any of the value ratings.

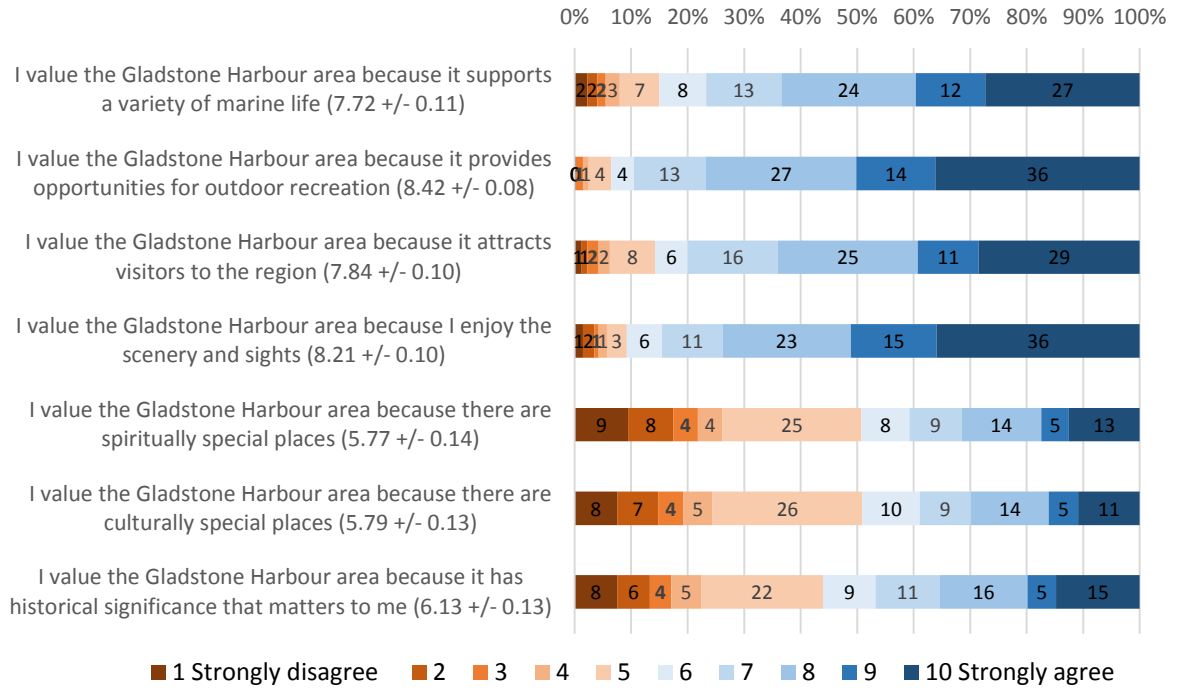


Figure C2.7: Measures of Values of Gladstone Harbour

Appendix D: Full details of recreation activity and economic valuation update

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 in the Economic component of the report card. Three types of recreational activity (beach recreation, land-based recreation and recreational fishing) are applied as separate indicators.

A total of 401 responses were collected in the 2016 Gladstone community survey. Only 37 respondents (9%) had not visited the Gladstone Harbour area in the last 12 months, and 347 (86.5%) respondents had visited the harbour for recreational purposes (no change from 2014 and 2015).

The majority of respondents (71%) indicated that their recreational use of the harbour had not changed in the last 12 months with more people reporting increased use (17% [2% more than 2015]) than decreased use (12% [5% less than 2015]). As occurred in the 2015 survey, 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.¹⁶

More than a third of respondents (35%) indicated they own a boat. In the last 12 months, there had been little change in use of boat ramps.

- 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)
- 2015: 159 (40%) respondents had used a boat ramp in the past year; an average of 21 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 (93%) and beach recreation (92%), but only 39% had engaged in recreational fishing. Details of trip frequencies for the different activities are provided in Table D8.

¹⁶ 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% levels respectively.

Table D8: 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%	21	5.2%	2	0.5%
2-3 times a week	115	34	8.5%	36	9.0%	7	1.7%
About once a week	60	31	7.7%	55	13.7%	9	2.2%
About 1 every 2 wks	30	55	13.7%	57	14.2%	14	3.5%
About once a month	13	85	21.2%	89	22.2%	40	10.0%
About 4-6 times a yr	5	76	19.0%	62	15.5%	33	8.2%
3 times per year	3	27	6.7%	18	4.5%	15	3.7%
2 times per year	2	33	8.2%	27	6.7%	26	6.5%
About once a year	1	13	3.2%	9	2.2%	12	3.0%
Never	0	31	7.7%	27	6.7%	243	60.6%
Total		401	100	401	100	401	100
2016 Avg trips per year (users)		34.23 (n=370)		41.33 (n=374)		19.04 (n=158)	
2015 Avg trips per year (users)		29.46 (n=364)		33.08 (n=379)		17.44 (n=153)	
2016 Avg trips per year (full sample)		31.58 (n=401)		38.55 (n=401)		7.50 (n=401)	
2015 Avg trips per year (full sample)		28.37 (n=378)		32.65 (n=384)		6.69 (n=399)	

A comparison with frequencies reported in 2015 is provided in Figure D16, Figure D17, and Figure D18 for beach, land and fishing recreation respectively. There appears to have been a small increase in the frequency of recreational activity in the harbour for all three activities. Paired sample T tests indicate there is a statistically significant increase in frequency of beach recreation (full sample) compared to 2015 ($t=5.351$; $p=0.0000$) and for other land-based recreation ($t=1.935$; $p=0.054$). The small increase in recreational fishing activity is not statistically significant.

One reason for the increase in the frequency of recreational activity could be related to the sample demographic with a larger proportion of younger people and a lower proportion of older people represented in the 2016 sample compared with the 2015 sample. It could also be related to improvements in harbour access, as indicated by an improvement in the score for that Indicator group in the results for the social component of the report card.

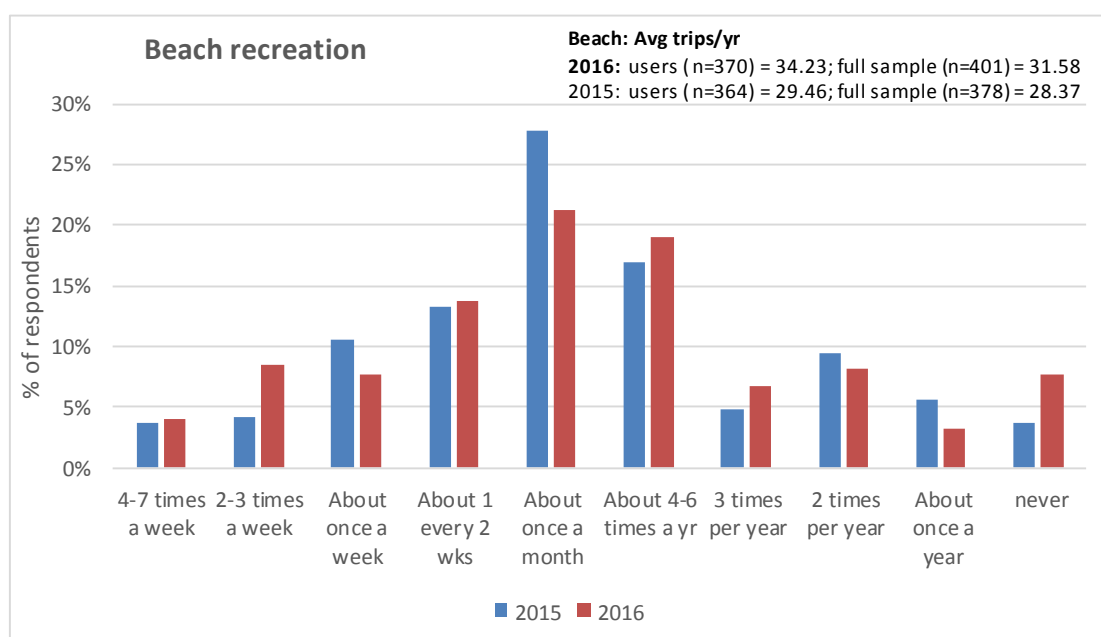


Figure D16: Beach recreation trip frequency rates: 2015 - 2016 comparison

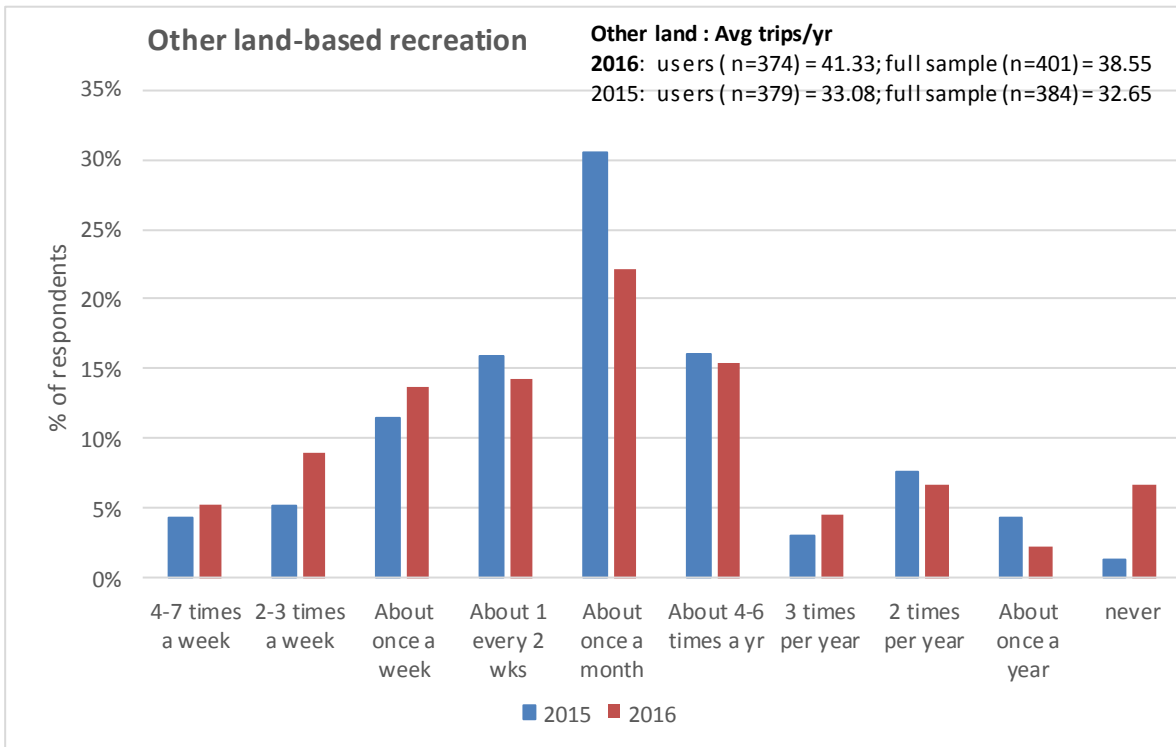


Figure D17: Other land-based recreation trip frequency rates: 2015 - 2016 comparison

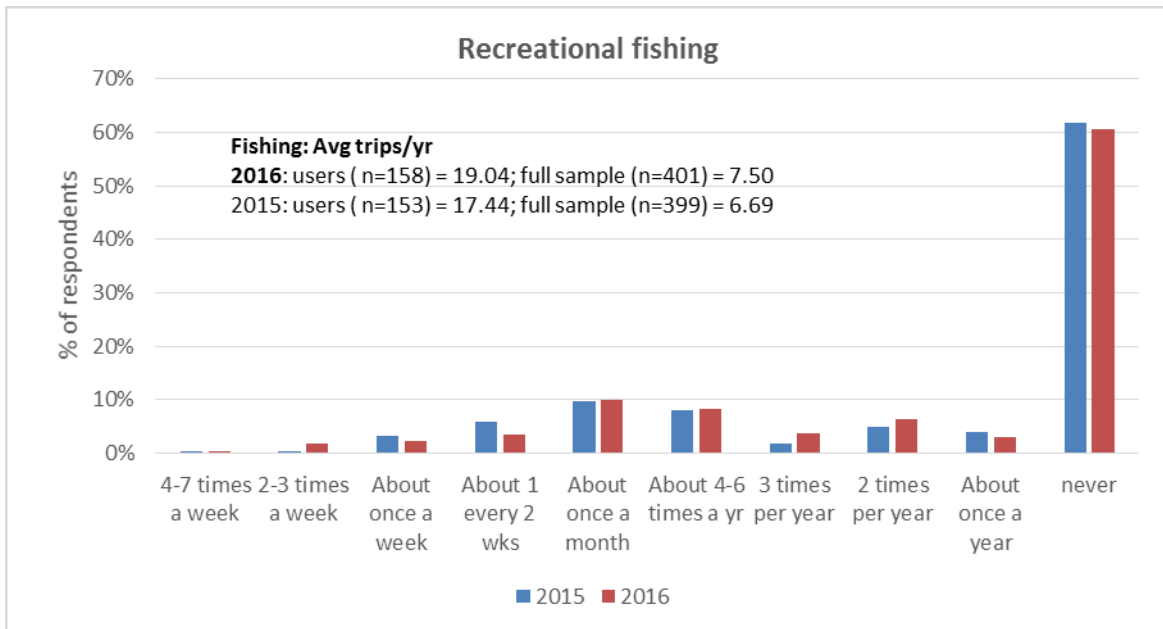


Figure D18: Recreational fishing trip frequency rates: 2015 - 2016 comparison

Other general warm-up questions indicated that Tannum Sands, Boyne Island and Spinnaker Park artificial beach were the most popular beaches to visit (Figure D19). Compared to the previous year, there appears to have been an increase in the popularity of Boyne Island and (to a lesser extent) Tannum sands as a beach destination, with a decrease in the popularity of Spinnaker Park artificial

beach. Walking, picnicking and relaxing were the most popular land-based recreational activities with increases recorded in all activities compared to the previous year, apart from picnicking (Figure D20).

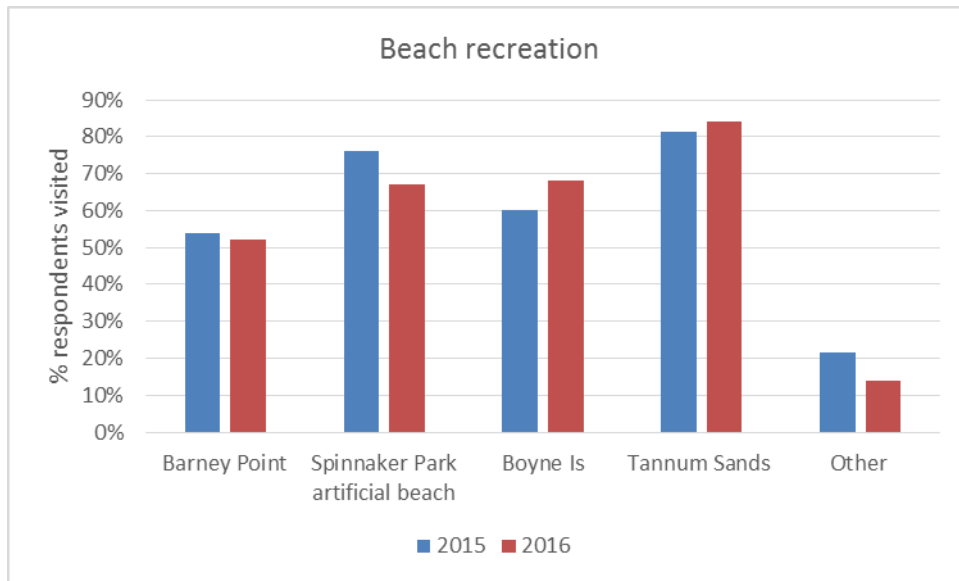


Figure D19: The most popular beaches visited by surveyed Gladstone residents

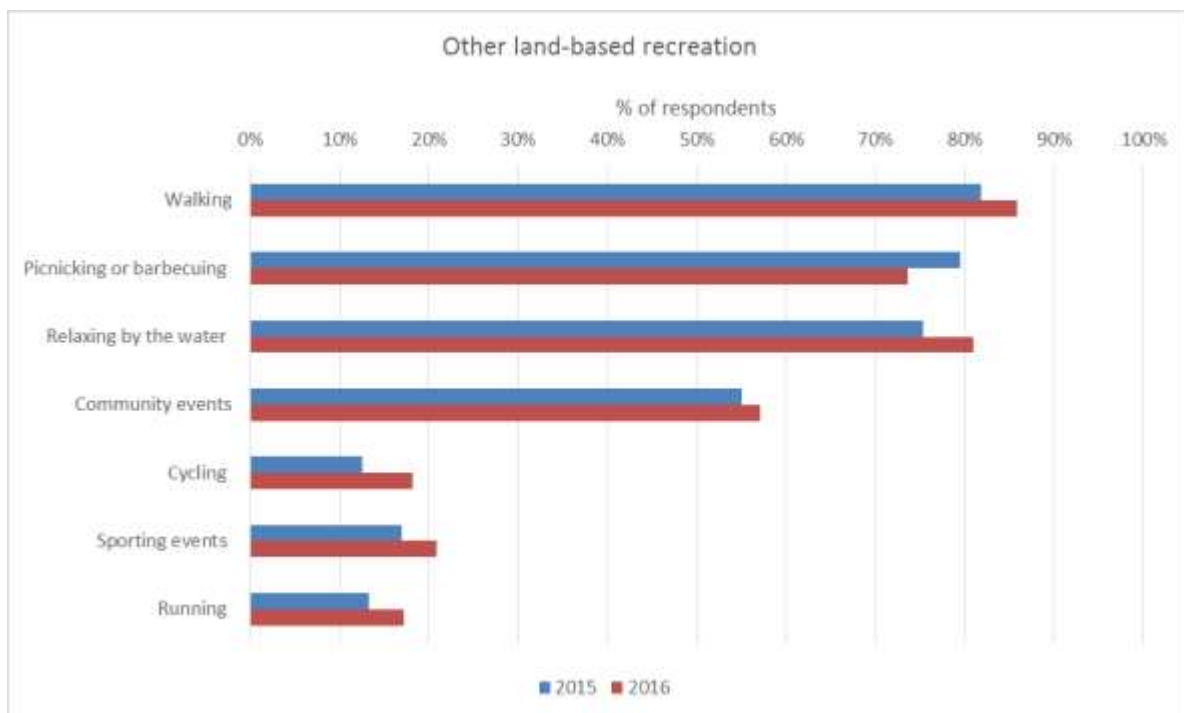


Figure D20: Popular land based activities listed by recreational visitors

D.1 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 2016 CATI survey) and extrapolating the information to the Gladstone population. Details of the current trip frequency rates are provided in Table D8.

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) 2011 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 24,987 households in Gladstone, based on an average household size of 2.7 persons (ABS 2011 Census) and a population of 67,464 in 2015 (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 48,574 adults in this age group assuming the proportion of adults (18-80) was 72% of the population (the same as in the ABS 2011 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 D9 with small increases in the annual value of recreational activity compared with the previous year associated with an increase in the size of the population as well as some increase in the 'trip' frequency for all three activities. The increase is most notable for land-based recreation, related to a larger increase in trip frequency compared with the other activities (Table D8).

The average annual value of recreational trips for 2016 is:

- \$31.79 million for beach recreation (\$27.98 million in 2015)
- \$54.75 million for land-based recreation (\$45.43 million in 2015)
- \$24.43 million for recreational fishing (\$21.34 million in 2015)

Table D9: Summary of updated recreation value estimates

	Beach recreation	Land-based recreation	Recreational fishing
Trip value (95% confidence intervals [CIs])	\$40 (\$26 - \$105) ¹	\$61 (\$48 - \$85) ¹	\$143 (\$73-\$4,137)
Full sample: Avg # trips/yr	31.58 (2015=28.37)	38.55 (2015=32.65)	7.50 (2015=6.69)
Annual value per trip (full sample)	\$1,270 (\$821 - \$3,316)	\$2,369 (\$1,850 - \$3,277)	\$1,074 (\$547-\$31,043)
Gladstone: Annual value of recreation trips	\$32 million (\$21M - \$83M)	\$59 million (\$46M - \$82M)	\$27 million (\$14M-\$776M)
Trip value/ adult (CIs)	\$21 (\$13 - \$46) ¹	\$27 (\$20 - \$42) ¹	\$60 (\$31-\$1,746) ²
Mean annual value per adult (full sample)	\$656 (\$411 - \$1,453)	\$1,036 (\$771 - \$1,619)	\$453 (\$231-\$13,098)
Gladstone: Annual value of recreation trips	\$31.86 million (\$18M - \$71M)	\$50.32 million (\$37M - \$77M)	\$22.20 million (\$11M-\$636M)
2016 Gladstone: Avg Annual value of recreation trips (CIs)	\$31.79 million (\$20M - \$77M)	\$54.75 million (\$42M - \$80M)	\$24.43 million (\$12M - \$706M)
2015 Gladstone: Avg Annual value of recreation trips (CIs)	\$27.98 million (\$18M - \$68M)	\$45.43 million (\$35M - \$67M)	\$21.34 million (\$11M - \$617M)

¹ Estimates from the 2014 report card

² Estimates from the 2015 report card

D.2 Satisfaction scores and grades 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). This provides the basis for the ABCDE grading. The satisfaction ratings for the three recreational activities, as well as a comparison with 2015 ratings are presented in Figure D21.

Overall, respondents reported high levels of satisfaction with a mean scores of 8.12, 8.22 and 7.15 for beach recreation, other land-based recreation and recreational fishing respectively. There was a statistically significant (paired samples T test) increase from 2015 in mean rating scores for beach (t=2.525; p=0.012) and land-based recreation (t=2.236; p=0.026) and a statistically significant decrease in the satisfaction with recreational fishing (t=3.770; p=0.000).

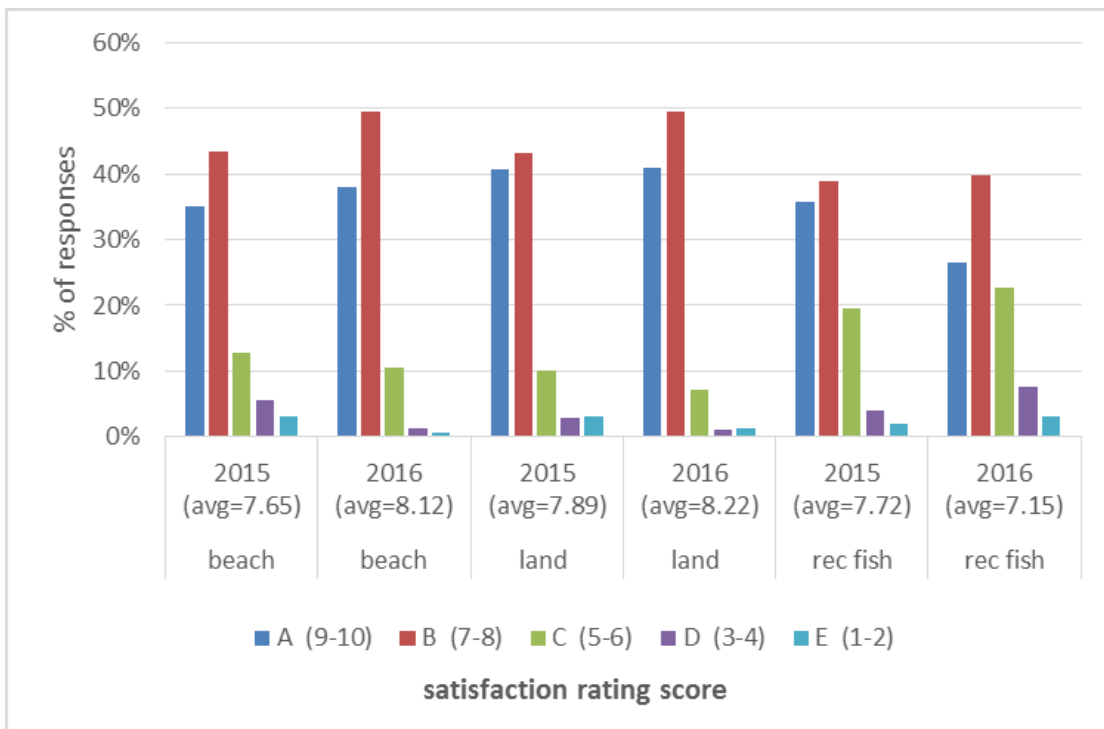


Figure D21: Satisfaction ratings for recreational activity

Appendix E: Future recommendations

E1. Data analysis (further amendments/attention required)

In 2016 all the data analysis was automated for the first time. However, in the process of checking the code, some errors and anomalies were identified in the data analysis for 2015 which then became repeated for the 2016 calculations. While some issues were corrected, there are some corrections that should still be addressed in future report cards. These are outlined below. Other recommendations for attention are also outlined.

E1.1 Social measures

'Satisfaction with harbour recreational activities' indicator

There appears to be an ongoing issue with the calculation of the score for the 'Satisfaction with last trip' measure in the social indicator 'Satisfaction with harbour recreational activity'. In the R-script, Q28a (Q28A.I am satisfied with facilities associated with boat ramps in the Gladstone Harbour area) is applied, but this measure should be included with Q28 (Q28.I am satisfied with the quality of boat ramps, available in the Gladstone Harbour area) to assess the score for the 'Quality of ramps and facilities' measure. In 2016 no assessment was made for the 'satisfaction with last trip measure'.

This was a single question (Q25) in the 2014 survey but is now a combination of three question with satisfaction rating for each of the three rec activity types (Q11b, Q15b and Q25). It should be noted that in the raw data from the CATI service provider the script for Q 25 reads as overall satisfaction, but the respondents were asked specifically about satisfaction with the recreational fishing trip.

The measure should be an average of the satisfaction scores for the three different types of recreational activity.

Recommendation 1: The R-script be amended for the calculation of the scores for the two measures to assess the Social indicator 'Satisfaction with harbour recreational activities'.

'Marine safety incidents' measure (Harbour safety indicator)

In the 2015 report, the score for the measure 'Marine safety incidents' (R-script (*Irate*)) was estimated using the ratio of incidents with the combination of recreational vessels and commercial vessels registered within each maritime region. In 2016, matching information could only be found for recreational vessels. Consequently, commercial vessel counts were not included in the assessment of the 'marine safety incidents' measure.

Recommendation 2: The R-script for the estimation of scores for the 'Marine safety incidents' measure be amended to reflect the lack of information on commercial vessels, or that new data sets be identified

E1.2 Economic measures

In the official list (Appendix A) it is stated there are 13 measures in the Economic component, but only nine are listed in the diagram. This needs to be clarified. This report has made reference to 11 economic measures. In Appendix A, reference is made to four measures for the Commercial fishing indicator (Line, Net, Trawl and Pot) but they are grouped together as if combined into one. It is not clear if they are being counted as separate measures. Separate scores for each measure are generated in the R script and they are recognised and treated as separate measures in the report.

Recommendation 3: The number of measures listed (Appendix A) for the Economic component be clarified.

Line fishing measure (Commercial fishing indicator)

Commercial fishing comprises a combination of four types of fishing techniques (line, net, trawl and pot) as indicator measures. While data for net, trawl and pot fisheries contain values for each year and each Grid region, line fishing has many missing values. For example, there are no reported values for several years starting from financial year 2005 for any of the three regions.

In the 2015 report card, all these missing values in the “newfishdata” input dataset were converted to ‘0’. This conversion was done so that all production years in the dataset (including the ones where missing values were present) could be used instead of being simply dropped from the analysis. In 2016, this practice has been replicated to ensure comparability with last year’s results. It should be noted though that converting values in this way introduces a bias as missing values are different from ‘0s’.

As a consequence, the Gross Value of Production (GVP) calculated for Commercial fishing in Gladstone is likely to be underestimated. This also has consequences on the calculation of the scores and grades related to the entire Economic performance indicator group. Attention needs to be paid to this issue for future report cards. In particular, it is recommended that the analysis of Line fishing data, particularly the treatment of missing values, be reconsidered due to the large number of missing years. Alternative or supplementary fishery productivity metrics might need to be considered to improve the robustness of that particular measure.

Recommendation 4: Attention be given to the estimation of scores for the Line fishing measure and particularly the treatment of missing values.

Tourism expenditure measure (Tourism indicator)

There is no evidence that the number of visitors to the Gladstone Harbour Visitor Information Centre have been applied as a measure for the Tourism indicator. No separate score is generated in the R-script. No reference is made to this measure in the report. In future, either reference to be measure should be removed or information the R-script needs to be amended to include this measure in the calculation for the indicator.

Recommendation 5: Consideration be given to the inclusion (and estimation) of the measure ‘Number of visitors to Gladstone Visitor Information Centre.’

Secondary data baselines

Due to changes in the availability of secondary data and some anomalies in the previous report as well as the R-script, three different baseline periods have emerged (10 year; 12 year (commercial fishing) and 20 year (shipping). It is recommended that a uniform baseline with a 10 year moving average be applied as to match the initial intent outlined in the 2014 report.

Recommendation 6: Consideration be given to ensuring a uniform approach of a 10-year moving average be applied to secondary data sources. Amendments to the R-script will be required.

Economic performance indicator group

In the section of the R-script that combines the three indicators (Shipping, Tourism and Commercial fishing) the code contains hard-coded values rather than values obtained straight from input files. This means that the script must be edited every year. There is also reference to a hard code value in the script for the indicator tourism expenditure. In addition, it is not clear how the hard coded values for the means and standard deviations had been generated. The overall score for the indicator group is currently dominated by the score for shipping which might not be appropriate.

Recommendation 7: In the script for Economic performance, attention be given to amending to R-script to avoid the use of hard coded values to provide reference to an input file. In addition clarification is needed to verify the aggregation process from the indicator to the group level.

Summary figures for Economic performance Figure 15a-d: There remain some issues to resolve in the R script to generate the full set of figures. Currently there is no R-script to generate the figure for the mean and SD for Economic performance. In addition all the labels have already been written into the script and some could be improved.

Recommendation 8: The R-script to generate the summary Figures for Economic performance be completed so a full set of diagrams can be presented.

E2. CATI survey questionnaire

All question numbers in the survey have remained the same (refer to the same question) over time and this practice should be maintained. If new questions are included then new question numbers will need to be created. Some questions relating to information about recreational activity were used only once in the 2014 survey, but these numbers should not be reactivated for new questions in the future. It is best to create new numbers.

E2.1 Questions to be deleted from the survey

- **Q7a** (*Q7a. When you think of the reason for your greater or less recreational activity in Gladstone Harbour, what two or three words come into your mind?*)
 - This question is redundant and the results have never been reported.

Note: In the 2015 report at the start of Section 3.2 (p.29), there is a comment that an addition question was added and “respondents were asked to give one (or up to three) words to describe the change in harbour health as compared to 2015”. There are no apparent results (unless Q7a had been reworded in the survey script but not in the label for the results [which had occurred for QXX] and no Word cloud with the result was provided.

- **Q48 and Q49** (*Q48. I believe the traditional sites and customs in the Gladstone Harbour area are well protected*) (*Q49. I believe the Traditional Owners of the Gladstone Harbour area are well consulted by the regional managers*)
 - These questions were included in the initial 2014 CATI survey when there were some deficiencies in the assessment of cultural heritage values. These deficiencies have since been addressed and these questions are no longer useful and not do relate to the assessment of ‘Sense of place’ indicators. The results have not been reported since 2014.

Recommendation 9: Delete questions Q7a, Q48 and Q49 in the CATI Survey.

E2.2 Questions be added to the survey

- A question to collect demographic information about the educational background of survey respondents was inadvertently omitted from the initial pilot survey in 2014 and the omission has not been rectified. It is recommended that the question be inserted in the future.

Recommendation 10: Insert a question asking details of educational background in the demographic section of the CATI survey.

E2.3 Supplementary data collection

The economic value of a recreational fishing trip was estimated from data collected in the 2015 survey. Information was collected from 154 respondents. However, because the costs associated with a fishing trip vary considerably (e.g. whether it was a boat trip or not) there is considerable heterogeneity in the travel cost data. There is considerable skewness in the current value estimate (mean value \$143 and 95% CIs; \$73-\$4,137). Larger sample sizes are required to improve the accuracy of the analysis. It was recommended in the 2015 report that additional data be collected to provide a most robust estimate, but this was not include in the Scope of Work for the 2016 report.

It is recommended that for the 2017 report, as a preliminary assessment, data collected in the 2014 survey be combined with the 2015 data to see if more robust estimates can be determined. If not, then it is recommended that additional data be collected for recreational fishing activity.

Recommendation 11: Consider reassessing the value of recreational fishing to include data collected in 2014 or collecting addition data in 2017

The use of boats and harbour access and usability are important issues in the health of Gladstone Harbour. In the initial 2014 survey, insufficient information was collected to estimate a separate model for boat-based recreation, other than recreational fishing.

- It is recommended that this is revisited in the 2017 and information collected to estimate the value of boat-based recreation generally. It would be possible to approximately identify the proportion of value attributed to recreational fishing.

Recommendation 12: Consider collecting additional valuation data to estimate a recreational value for general boating activity (with recreational fishing as an identifiable component).

E2.4 Survey collection method

The current survey collection method is not ideal. There are two principal limitations: sample bias and presentation limitations. A telephone survey is associated with notable sample bias where older people are over-represented and younger people are under-represented. Only people with a landline are targeted as it is not yet possible to seed/select mobile phone numbers by geographical area. There are also limitations to the information that can be presented to respondents in a telephone interview, particularly in terms of memory retention and visual presentation. It is difficult to provide any detailed background information and there are limitations to the questions that can be asked.

An online survey collection method would provide better opportunities to both collect and provide information. However, it would take advance planning to implement an online survey and ensure an adequate response rate. To date there has been insufficient preparation time to develop and organise the CATI survey with the results being a milestone requirement within about a month of signing the project contract. This has meant that the data collection method has defaulted to the fastest collection method for a regional area rather than the most appropriate. In large urban cities the fastest option is to source respondents through access to an online internet panel, but these do not have adequate coverage in regional areas. A mail-out survey is not recommended. They are also the slowest collection method, response rates are very low and unpredictable, and they are prone to transcription error.

Recommendation 13: The survey collection method be changed to an online format.

However, this would require more lead time and the contract for this project would need to commence at least 2-3 months before the survey results are required. Lead time would depend on whether or not additional data is to be collected such as values for environmental assets.

In all three years, contact details has been collected from respondents who have indicated they would be willing to complete the survey again in the future. These people could be contacted and provided with a link to an online survey. However, additional efforts would need to be applied to recruit a higher proportion of younger respondents and this would require more lead time (and potentially higher costs). There are also some benefits and limitation to consider in re-using the same survey respondents. Some continuity has benefits as any change in opinions are not associated with any change in the sample demographic, but on the downside it excludes/restricts the inclusion of new people with different opinions and backgrounds. A mixture of the two methods might be a realistic first step.

E3. Secondary data sources: Economic performance indicator group

The sources of secondary data used to inform the Economic performance indicator group are limited and focused on applying publically available data. There are advantages in applying publically available data sources as this can provide consistency across report cards and can be included in has potential application in other similar regional report cards for comparative purposes. However, publically available data is limited in scope and only provides a restricted assessment of Economic performance. Other potential options are suggested below. It is recommended that any potential options to include new data into the report card are explored in detail before being formally incorporated into the report card structure.

E3.1 Gladstone industry

Gladstone harbour support a strong industrial economy, but the economic importance of industrial activity is only captured in one indicator (Shipping activity) and only assessed in terms of the number of containers by product type (coal, bauxite and other). Currently, ongoing discussions are being held with Patrick Hastings to explore the potential for major industries to provide more detailed economic data on the value of their throughput on a regular reporting basis, which could be included on a consistent basis in future report cards. Patrick Hastings is the Chief Executive Officer of the Gladstone Industry Leadership Group and also a member of the Gladstone Healthy Harbour Partnership management group.

Recommendation 14: Discussions within GHHP are conducted to further explore the option of receiving regular annual data reports from the Gladstone Industry Leadership Group.

E3.2 Gladstone Regional Council

Gladstone Region Council currently provide information on their website about economic and community profiles: <http://www.communityprofile.com.au/gladstone/>; <http://www.economicprofile.com.au/gladstone/>. All information is sourced from the Australian Bureau of Statistics (ABS) and is disaggregated and presented for the Gladstone region through an economic consultancy group (REMPPLAN). The public is able to access the REMPLAN data on request.

There is some very useful information on the website that could potentially be included in the report card. However, one of the main limitations is that the data is only updated irregularly according to ABS releases. At best, the most current information relates to 2015. However there is potential to report some of the trend analysis albeit that the current reported year relates to the year prior to the current report card. Another potential disadvantage is the continuity of this data provision, although private arrangement could be made directly with REMPLAN.

One of the advantages of applying this data is that State level data is also available which would provide the basis for comparison as the benchmark.

Recommendation 15: Discussions take place between GHHP, Gladstone Regional Council and REMPLAN to explore the availability of updated data and that an assessment be made of its relevance and usefulness to be included in future report cards.

Recommendation 16: Explore the potential data availability of housing data that might be applied in future report cards.

E4. Expanding the scope of data collection (Economic value of environmental assets)

In the Scope of Work for the 2014 pilot report card there was reference to assessing the non-market values of environmental assets in the economic value indicator group. Time limitations had excluded the possibility of exploring this option. While an economic valuation would be possible it would require a 2-3 month development period to explore and test the valuation options. It would also need to be implemented in a visual format such as an online survey.

Recommendation 17: A pilot project be conducted in 2017 to assess the potential to include the non-market values of environmental assets in future report cards. If successful then these values to be included in the 2018 report card.

E5. Governance

Recommendation 18: The contract for this project be extended to a three year period to ensure more continuity and investment into future report cards. Some internal details and information are getting lost in the transfer between the contracts each year.

E6 Information dissemination

The information collected in the CATI survey is being underutilised. The rich picture of community attitudes to the harbour and more detailed information about recreational activity is getting lost. This report focuses on the grades and scores for all the indicators and assessment levels and the details of the survey results are relatively hidden in the Appendices and not readily accessible to the general community. However, the information is potentially very interesting and useful to the wider community.

Recommendation 19: An additional information booklet or brochure be produced that outlines more of the results from the CATI survey and that the document is made readily available for the community.

E.7 Summary of recommendations

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Appendix F: Details of data analysis modifications from the 2015 report card

Subject of change	Rationale to change	Impact of change
<p>Shipping activity:</p> <p>The “Shipping activity” indicator uses time series data from 1996-97 to 2015-16 (20-year array). In contrast, the 2015 report used a 9-year array (2006-07 to 2014-15) and the 2014 report used an 8-year array (2006-07 to 2013-14).</p>	<p>The full range of available data available on the GPC website was used this year to provide a more accurate level of detail about the trend in shipping activity taking place over the past 20 years.</p>	<p>A 20-year array provides more information on the overall trend than an 8 or 9-year array. The baseline is defined as a 20-year average, rather than an 8 or 9-year average like in previous reports.</p>
<p>Tourism expenditure:</p> <p>Baseline data calculation uses 8 years from one data source (2005-06 to 2012-13, from http://economy.id.com.au/gladstone) and 2 years from another source (2013-14 & 2014-15, from www.economicprofile.com.au/gladstone/tourism/output).</p>	<p>The original data source became inaccessible last year. We replicated the same procedure as in the 2015 report card.</p>	<p>“Hybrid” indicator created using a combination of 2 sources. Sub-optimal.</p>
<p>Commercial fishing:</p> <p>The indicator for commercial fishing uses a 12-year average computed from a 12-year array ranging from 2004-05 to 2015-16.</p>	<p>In 2014, a 10-year average was used (2004-05 to 2013-14). In 2015, an 11-year average was used (2004-05 to 2014-15). We decided to use a 12-year average to replicate what was done last year and did not modify the R script.</p>	<p>Sub-optimal indicator. Going back to a 10-year average seems more appropriate and should be recommended for next year’s analysis.</p>