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Final report on the status of economic, social, and selected cultural indicators for the Gladstone Healthy Harbour 2015 Report Card

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Executive summary

Report cards have become an increasingly popular way to measure the current status and the progress towards meeting environmental and ecosystem health goals. Most report cards focus on the biophysical components of the system, however including the social and economic implications of ecosystem management provides a richer social-ecological system understanding. The Gladstone Healthy Harbour Partnership (GHHP) report card goes beyond ecosystem health to include reporting on progress towards social, cultural and economic goals for the Gladstone region.

By assessing the social health of the harbour using some selected indicators, this report card provides a snapshot of harbour health from community perspectives. In order to assess the social health of the harbour, eight sub-indicators were aggregated into three indicator groups: harbour usability, harbour access, and liveability and wellbeing. The cultural component with the exception of indigenous culture has one indicator group, sense of place, which is aggregated from six sub-indicators. Economic health component is also assessed with eight indicators aggregated into three indicator groups being economic stimulus, economic performance and recreational value. All sub-indicators are comprised of between two and four measures.

The GHHP vision includes detailed statements relating to environmental, social, cultural and economic aspects of the health of Gladstone harbour. The vision was developed by the local Gladstone community, including Traditional Owners, community members, government, research organisations, conservation groups, both recreational and commercial fishers and industry.

The GHHP goals are designed to reflect how a healthy harbour influences the Gladstone community (Greer and Kabir, 2013). Each of the indicators are linked back to the GHHP vision and goals. For instance, the social indicators address the following report card objectives which focus on the propensity to:

- Maintain or improve easy access to the harbour waters and foreshore for recreation and community uses,
- Maintain or improve a safe harbour for all users, and
- Enhance liveability and wellbeing in the region.

The key aim of this report is to summarise the first process of assessing the state of the economic, social and cultural indicators for the 2015 GHHP report card system. This is based substantially on the approach for the 2014 pilot report card for the collection and analysis of data relating to appropriate economic, social and cultural indicators.

In assessing the indicators each measure was weighted to reflect the relative importance of the management objective, according to responses to an online survey tool which collected opinions from a selection of 'experts' (i.e. those with a management or industry role), (n=31), and community members (n=200). These surveys were conducted in 2014 and applied three commonly used approaches to determine weights for each measure so that when combined across the whole group of measures, scores are produced for indicators. The weighting applied included the views of the general community, and key stakeholder and management groups. The three approaches used for the weightings included: simple ranking approaches, scoring-based approaches and the Analytic Hierarchy Process (AHP) based on a series of pair-wise comparisons. The resulting weights were very similar between the expert and community groups.

Collecting and modelling the data

The key indicators for social health of Gladstone harbour were defined by McIntosh et al. (2014a). Measures to evaluate those indicators were developed through a social, cultural and economic project

workshop and a survey of social scientists (Pascoe et al., 2014c). The measures, which took the form of specific questions related to the indicators, were used to design a community survey of local residents. The survey included 75 questions relating to the GHHP social, cultural and economic objectives. Although the questions were largely qualitative in nature, they were designed to be answered on a 10-point agree-disagree scale to produce quantifiable results. This also ensured that answers would be comparable to other studies such as the Social and Economic Long Term Monitoring Program (SELTMP) for the Great Barrier Reef (Marshall et al., 2014) and will enable elicitation of trends over time (Pascoe et al., 2014c).

Primary data to assess the social measures were collected using a Computer Assisted Telephone Interview survey (CATI) of 400 local residents undertaken in September 2015. Participants were contacted using a random dialling technique of households in the Gladstone local government area (LGA). The CATI survey collecting participants' perceptions of the harbour (usability, access), liveability and wellbeing and sense of place).The questionnaire was designed to ensure that survey responses were comparable with other studies in the region and will enable elicitation of trends over time. The survey respondents were evenly divided by gender (49.5% male and 50.5% female) and the age of respondents ranged from 18 to 65 plus years. The survey was administered by trained research interviewers and monitored for quality control.

In addition to the CATI survey a range of secondary data sources were also used to derive measures for both the social and economic components of the report card. Those data sources included Gladstone Regional Council (GRC), the Australian Bureau of Statistics (ABS), Gladstone Ports Corporation Limited (GPC), the Queensland Department of Agriculture, Fisheries and Forestry (DAFF), the Office of Economic and Statistical Research and Gladstone Visitor Information Centre. The 2015 report card was based on data for 2014-15 or the most recent data available (Pascoe et al. 2014a).

Many economic measures are quantitative and therefore require different approaches. As such, one section of the CATI survey asked a range of questions designed to elicit the non-market economic values of recreation in the Gladstone harbour area, which once analysed produced a Travel Cost Method (TCM) model. Using secondary economic data, measures of capacity utilisation were developed for the commercial fishing and shipping industries in the harbour area and adjacent waters. The measure of socio-economic status applied in the analysis was the index of economic resources (IER), which is a composite measure of the economic wellbeing of a community or region. The IER index takes into account income variation in a population (both high and low), as well as household ownership, costs of living and other indicators relevant to economic wellbeing in a community. The information underlying the IER is available from Australian Bureau of Statistics census data.

To estimate the performance of an indicator or measure requires a comparison against some benchmark or baseline level of each measure, indicator and indicator group. An A-E scale was used for the final objectives assessment, and also used for the indicator and measure assessment. For the 1-10 scale cultural and social measures, a simple translation of 1-10 "satisfaction" scale (i.e. agree-disagree scaling used in the community survey) to A-E scale can be made. For much of the secondary data, a range of different baselines and 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, and a distribution of "potential" outcomes generated against which the current value could be evaluated. Each of these baselines and benchmarks is described in this report.

The relationship between the measures, indicators and the indicator groups was developed using a Bayesian Belief Network (BBN) approach. Bayesian networks are graphical models to which probabilities of certain outcomes given certain situations or observations can be assigned. The key difference of Bayesian network models is that the output displays the probability of an outcome rather than a discrete (deterministic) result (Jensen and Nielsen, 2007). From the probability distribution (determined by the weights and relationships determined via the expert, community and social scientist surveys described above), a mean (expected) outcome and confidence interval was determined. Then a final 'score' applied to each indicator, indicator group, and component.

Overall Results

Social

The overall grade for the social component of the 2015 Gladstone harbour report card was a C (the same as in 2014)**.** The grade for social health was mainly determined through a community survey of 400 people from the Gladstone Local Government Area that was conducted in September 2015. Survey respondents were asked to respond to a range of questions on a 10 point agree/disagree scale. Report card scores were calculated based on these responses. The three indicators assessed to determine this grade were harbour usability, harbour access, and liveability/wellbeing.

Harbour usability received a score of 0.75 (an improvement from 0.60 in 2014). Harbour access received a score of 0.62 (compared to 0.61 in 2014) with most survey respondents satisfied with their level of access to the harbour, their most recent trip to the area and the quality of boat ramps and facilities. Liveability and wellbeing received a score of 0.64 (same as in 2014) with most people agreeing that the harbour improves their liveability and wellbeing.

Economic

The overall grade for the economic component of the 2015 Gladstone Harbour report card was a B. The three indicators assessed to determine this grade were economic performance economic stimulus, and economic value.

The economic performance indicator group consisted of three indicators: tourism expenditure, commercial fishing and the level of shipping activity. These were selected to reflect the key industries using the harbour, and weighted according to economic activity and a survey of local industry and community leaders. The overall score for the economic performance indicator group was 0.79, lower than the 2014 report card in which the score was 0.83. This reflected slightly weaker performance of the fishing and shipping sectors, despite a slight increase in relative performance of the tourism sector.

The economic stimulus indicator group consisted of two indicators, employment and socio-economic status. The grade for employment was based on unemployment statistics for the Gladstone Local Government Area, which was compared with unemployment rates in all Queensland Local Government Areas.

The score for socio-economic status was derived using the Australian Bureau of Statistics (ABS) economic measure known as the Index of Economic Resources (IER). This was calculated using Australian census data for the Gladstone region, and then estimates were fine-tuned using the information collected in the community survey. Of the three indicator groups, economic stimulus received the highest score of 0.82, slightly lower than 0.87 in 2014. Most of this decline is attributed to a reduction in the score for unemployment. While unemployment in the region decreased, it did not decrease as much as many other regions in Queensland, so its relative performance worsened.

The indicator group for economic value was assessed in terms of non-market values of recreation and received a score of 0.72 (0.75 in 2014). This score was largely driven by declines in land-based recreational activities.

Cultural

The overall grade for the cultural component of the 2015 Gladstone harbour report card was a B which achieved a score of 0.65. This grade was determined based on the sense of place-related indicators. The highest value was recorded for attitudes to harbour (0.80) measure, while the lowest was recorded for measures of distinctiveness (0.55). Other measures of continuity (0.57) and self-efficacy (0.56) received similar scores to the 2014 report card. However the measures of self-esteem (0.72) and values of harbour (0.64) received increased scores as compared to the previous year. For this report, we provide only the sense of place measure due to indigenous cultural indicators being devised, measured and reported by an alternate research provider.

Recreational values of Gladstone harbour region

The travel cost model developed based on the analysis of the CATI survey provided information from which extrapolations of recreation values were determined. To extrapolate (scale up) 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 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 24,480 households in Gladstone, based on an average household size of 2.7 persons and a population of 66,097 in 2014 (QGSO). Second, to extrapolate the value of a trip per adult to the Gladstone population only adults between 18 and 80 years were considered. It was estimated that there were 47,590 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 in summary are that for the Gladstone region:

1. The value of a recreational fishing trip is estimated at $143 per trip.
2. The value of a trip per adult is estimated at $60 per trip per adult.

Overall, the average annual value of recreational fishing trips for the Gladstone population is calculated with two extrapolation methods at between $19.23 and $23.45 million. Land based recreation was the most important activity with the average annual value for the Gladstone population estimated at $45.43 million while Beach recreation was estimated to have an annual value of $27.98 million.

As explained in last year's report in Queensland, TCM has been applied in previous studies with the estimated recreational fishing values for the Capricorn Coast being $385 per trip (Prayaga et al., 2010) whereas in Moreton Bay recreational fishing values fall between $60 to $110 per trip with the range largely dependent on each model's underlying assumptions (Pascoe et al., 2014b). Rolfe and Gregg (2012) estimated the value of beach recreation for local residents along the Queensland coast from Bundaberg to Cairns (including Gladstone) at $35 per person per trip. Windle and Rolfe (2013) surveyed Brisbane residents and estimated an average trip value of $40 for Gold Coast beaches and $90 for Sunshine Coast beaches.

1 Introduction

While report cards originated in the education system as a means of reporting students' progress to their parents, they have evolved to report on a whole range of relative performance of schools, universities and health care to provide an incentive for these industries to improve their performance (Pickett et al., 2013, Palmer and Filoso, 2009, Mitchell and Parkins, 2011, Foley et al., 2012). Report card systems are now being used to measure and monitor relative regional economic performance of local governments (Bull et al., 2013). As a communication tool, report cards provide effective, succinct and informative 'snap-shots' of ecosystem health, and have become increasingly popular since the 1990s (Overton et al., 2013).

Some of the most well-known Australian ecosystem and waterways health report cards have been developed for the Great Barrier Reef, the Fitzroy Basin, Tamar Valley and south east Queensland (Connolly et al., 2013, Kuhnert et al., Abal et al., 2005). These report cards systematically present complex scientific information by comparing the status of a range of environmental indicators against environmental goals or desired trajectories.

While many ecosystem report cards are solely focused on the biophysical components of the system, the concepts of ecologically sustainable development (ESD) require that the triple bottom line be addressed which means that economic and social implications should also be included (Pascoe et al., 2014a, Dambacher et al., 2013). Participant and stakeholder involvement in the development of integrated coastal management enables understanding of complex environmental systems as well as an appreciation of the range of human perceptions to that environment (Vugteveen et al., 2015). For instance, in the long-term, annual monitoring of social, cultural and economic indicators will allow trends to be plotted over time to measure performance in relation to the GHHP vision and that of Gladstone as a healthy accessible working harbour.

1.1 Context for this report

During 2014 we developed methods for the determination of economic, social and cultural indicators and measures. The full details of the methodologies are provided in (Pascoe et al., 2014c, Pascoe et al., 2016). The same methods have been applied for most, although some minor changes were applied to the economic secondary data sources due to lack of persistent availability of data. For this report, we provide only a sense of place measure within the cultural indicators, due to indigenous cultural indicators being devised, measured and reported by an alternate research provider. The results of the indigenous cultural surveys will mean that indigenous cultural heritage indicators will be reported for the first time in the GHHP 2016 report card.

1.2 Aims and Objectives

The aims and objectives of this project support the following outcomes, the details of which are provided herein.

1. Collect social, cultural and economic data for 2014-2015 monitoring year. The data is sourced preferentially from long-standing organisations or data sources (as a guide, sources should have a minimum of 5 years of continuous data provision).
2. Determine all levels of report card grades and scores for social, cultural (excluding indigenous cultural indicators at this point in time) and economic indicators for 2014-2015 monitoring year. These grades and scores are calculated using the statistical methods developed during the pilot year.
3. Detail the methods and document any needs for amended methodology.

4. Report on and provide interpretation of the results trends of the derived 2015 grades and scores in comparison to the previous year).

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 (Figure 1) (McIntosh et al., 2014b). 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, funded the development of an annual "report card" that captured not only the biophysical aspects of harbour health but also economic, social and cultural aspects to guide and assist in environmental management and decision-making. Informed decision-making enables the clear identification of priorities for future improvements and potentially, restoration projects.

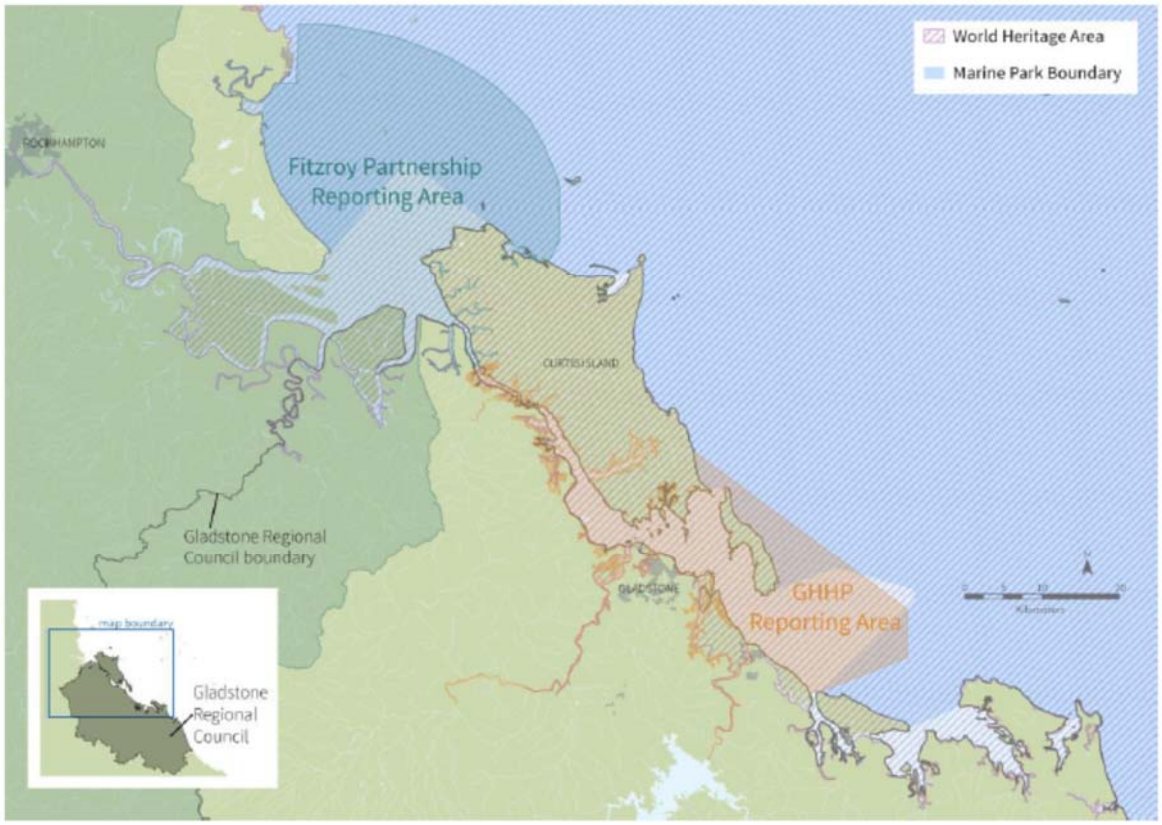


Figure 1: The GHHP area Source: McIntosh et al. (2014b)

This project 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.

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

** GHHP objectives discussed in this report.*

The GHHP report card grading system is depicted below in Figure 2. The system matches that of the Australian education system and is the first environmental report card to do so. It is important to note that while we provide in this report detailed results for the measures that generate the report card score at the indicator level (the measure level scores were not graded). In order to make this distinction clear, the graphs of indicator report card grades are colour-coded to match Figure 2.

Further we remind the reader that it is the combination of the measures for each indicator that reflects the grade and not an average of the measure scores (see details in section 2.4 Calculation and weighting of indicators). Those weighting combinations of measures are unique to each indicator; these are based on the findings of the expert surveys conducted in 2014 to create the Bayesian Belief network with this year's community survey and the secondary economic data to create this year's report card grades. For more detailed information, please refer to the final report for the piloting of this report card in 2014 (Pascoe et al., 2014c).

Figure 2: The grading scale to be used in the 2015 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 social aspect of harbour health was suggested by the ISP in 2014 (McIntosh at al. 2014).

We provide detailed explanations of the methods used in this project including information about the data collection process, the reporting zones, and both primary and secondary data sources are differentiated.

2.1 Data Collection

The appropriate measures to evaluate these candidate indicators were mostly identified by GHHP ISP and through a workshop with experts in sociology and economics (Pascoe et al., 2014c). The appropriateness of each measure was determined based on its relationship with the indicator/indicator group and its measurability. A Computer Assisted Telephone Interview (CATI) survey was conducted with residents in the Gladstone local government area (LGA) during the piloting phase of the study to collect social perceptions on each measure. This survey questionnaire was reviewed and fine-tuned by the project team and the GHHP ISP prior to administering. The questions were largely qualitative in nature, contained a number of questions related to the GHHP social, cultural and economic objectives and was 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 (Pascoe et al., 2014c). A full list of baselines used for social indicators is provided in Table 1.

A slightly modified version of this survey questionnaire was used to collect social data for the 2014-2015 reporting period. These changes are related to tourism and harbour safety indicators as described below.

- Estimation of tourism related values to the economy – due to the unavailability of the data source used during the pilot year, the 2014-2015 score was based on an alternative method which uses the data collected from the Gladstone Visitor Information Centre.
- Estimation of marine safety incidents – the maritime safety incidents (which includes collision between ships, collision with an object, capsizing and groundings) are now provided in accordance with the Commonwealth criteria[1]. To calculate the scores for marine safety incidents which reflects these new considerations a revised historical dataset provided in the 'Marine Incidents in Queensland 2014' report were used (DTMR, 2015). The report can be accessed from 'Marine incidents annual reports'.
- Estimation of Oil spills – data has also changed slightly since the rate of oils spills occurrences was also based on the number of commercial and recreational vessels. As explained, the way vessel

[1] "On 1 July 2013 the Australian Maritime Safety Authority (AMSA) began administering a new national maritime law that has resulted in most registered commercial vessels operating within the Commonwealth of Australia being regulated under the Marine Safety (Domestic Commercial Vessels) National Law Act 2012 (Cth). Consequently marine incidents that involve domestic commercial vessels (DCV) are reported to Maritime Safety Queensland as the delegate of AMSA under the Marine Safety (Domestic Commercial Vessels) National Law Act 2012 (Cth). If these incidents do not also involve a vessel which is regulated under the Transport Operations (Marine Safety) Act 1994—a Queensland regulated ship—then these incidents are not reportable marine incidents under the Transport Operations (Marine Safety) Act 1994 ..." (Source Marine incidents in Queensland report 2014)

numbers are reported in Queensland (also used for maritime safety incidents as explained above) has recently changed (MSQ, 2014). As such an updated time series of vessel data was used to calculate the oil spill indicator score. The Oil spills and Marine Pollution events reported to Marine Safety Queensland is available through the Queensland Government Data portal.

2.2 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 below. The Gladstone LGA and Gladstone Postal Area are shown in Figure 3.

- **Shipping data**: is limited to the Port of Gladstone.
- **Commercial fishing data**: is limited to the area within Queensland Fisheries S30 Grid which includes Gladstone harbour and the open coastal waters immediately adjacent to the harbour (see Figure 4).
- **Hotel occupancy data**: is limited to the Gladstone District Council area.
- **CATI survey**: the community survey was only administered to residents within the Gladstone Postal area as defined by the Australian Bureau of Statistics (ABS). However, a number of other postcode districts fall within the Gladstone region. The combined population of these additional regions is only around 1600 permanent residents compared to 33,000 in the Gladstone postcode area (most recent census figures in 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 3.

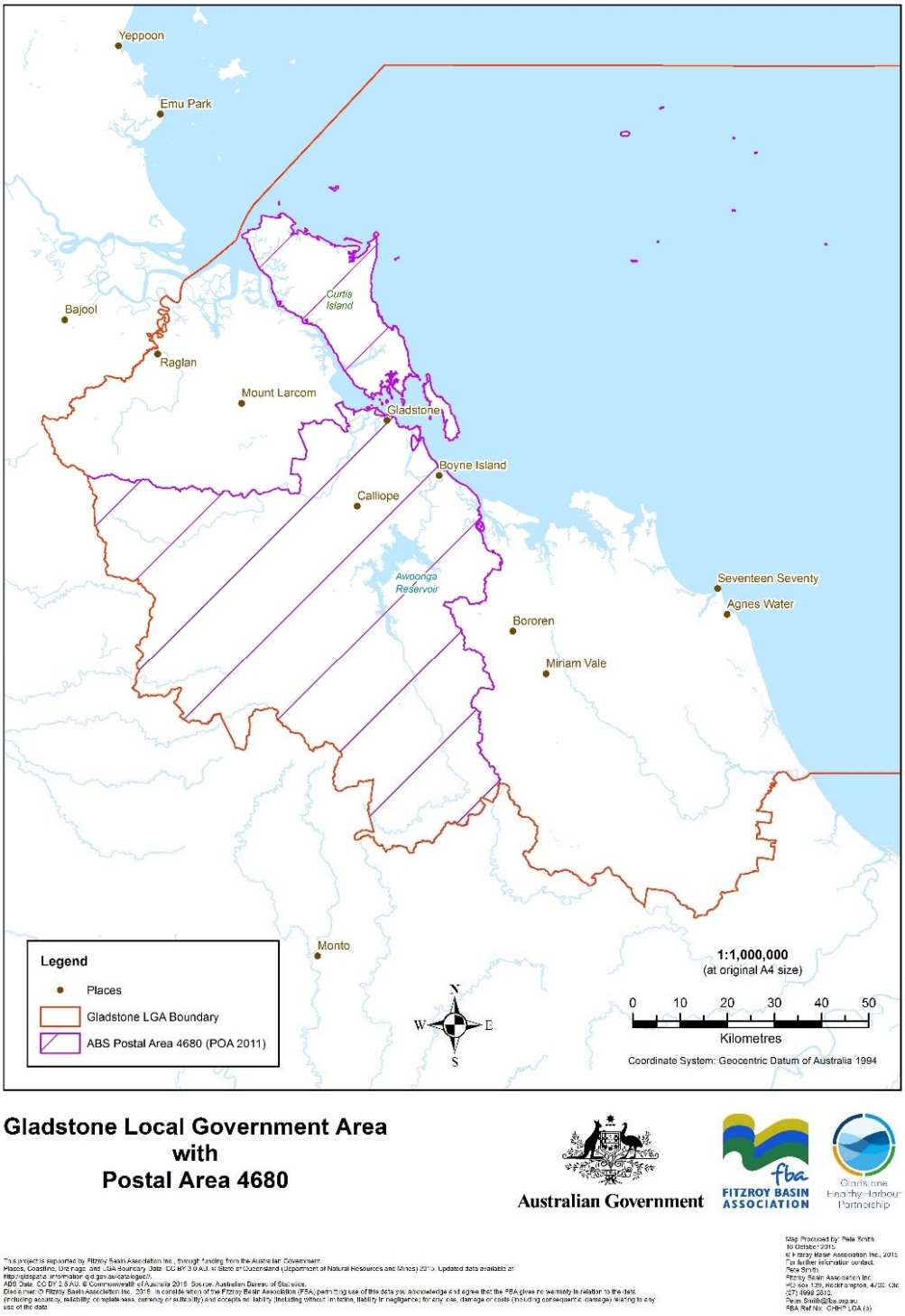


Figure 3: Gladstone Local Government area and Postal Area (Map courtesy of Peter Smith, Fitzroy Basin Association).

2.3 Indicators and primary data sources

We outline the indicators, measures, and baselines used for the social indicator group in Table 1. The baselines for all social indicators except for marine safety incidents and oil spills are based on 10 point scale questions in the CATI community survey. The baseline is the 2014 CATI survey data due to the absence of relevant social data prior to the commencement of the GHHP 2014 CATI survey.

Table 1: Indicator groups, indicators and measures used to determine social grades and scores for the 2015 report card (Source: Pascoe et al. 2014a).

Indicator Groups	Indicators	Measures	Data Source	Baseline
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 (2015) Marine incidents in Queensland, 2014	Data from 2005 - 2014 (calendar year) - Rate of incidents in Gladstone as compared to other Qld Ports
		Oil spills	Oil spills and marine pollution data: Marine Safety Queensland 2014	Data 2005-2014 (calendar year) – rate of oils 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	10 point scale
		Input into management	CATI Survey	10 point scale
	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

In Table 2, we outline the indicators, measures, and baselines used for the cultural indicator group. The baselines for all cultural (non-indigenous) indicators all utilise the 10 point scale in the CATI community survey. This indicator group has six separate indicators.

Table 2: Indicator groups, indicators and measures used to determine cultural grades and scores for the 2015 Gladstone Harbour report card.

Indicator Group	Indicators	Measures	Data source	Baseline
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

The indicators, measures, and baselines used for the economic indicator group are outlined in Table 3. The baselines for all economic indicators utilise secondary economic data sources while for economic value (recreation) the travel cost data derived from CATI survey is applied. This indicator group has three separate indicators.

Table 3: Data sources and baselines employed to derive the economic scores and grades for the 2015 Gladstone Harbour report card.

Indicator group	Indicator	Measure	Data source	Baseline
Economic performance	Commercial fishing	Productivity of line, net, trawl and pot fisheries estimated as total value of fish and crustaceans harvested from QFish zone S30 in four fishery sectors, trawl, pot, line & net	Queensland Fishing, Queensland Department of Agriculture and Fisheries	Time series data from 1990-91 and 2014-15
	Shipping activity	Shipping activity productivity calculated from Monthly shipping movements by cargo type (2014-15 financial year)	Gladstone Ports Corporation	Time series data from 2007 to 2014-15
	Tourism expenditure	Expenditure on hotel accommodation and food (2013-14 financial year) Numbers visiting Gladstone Visitor Information Centre	Expenditure on hotel accommodation and food (2013-14 financial year) Gladstone Visitor Information Centre Gladstone Regional Council Economic Profile (www.economicprofile.com.au/gladstone) Australian Bureau of Statistics Satellite Accounts 2013-14 Expenditure hotel accommodation (for 2003-04 to 2012-13 financial year)	Last 10 years average for 2013-14
Economic stimulus	Employment	Australian Bureau of Statistics (ABS) 2015: Unemployment statistics for the Gladstone Local Government Area (2015 March quarter)	Queensland Office of Economic and Statistical Research (via the Queensland Government Statistician's Office, Queensland Treasury)	Queensland 2015 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
Economic value (Recreation)	Beach recreation	Beach recreation satisfaction - Travel Cost questions in the CATI survey	CATI survey	10 point scale
	Recreational fishing	Recreational fishing satisfaction - Travel Cost questions in the CATI survey	CATI survey	10 point scale
	Land based recreation	Land based recreation satisfaction - Travel Cost questions in the CATI survey	CATI survey	10 point scale

2.4 Calculation and weighting of indicators

In assessing the indicators each measure was weighted to reflect the relative importance of the management objective, according to responses to an online survey tool which collected opinions from a selection of 'experts' (i.e. those with a management or industry role), (n=31), and community members (n=200). These surveys were conducted in 2014 and applied three commonly used approaches to determine weights for each measure so that when combined across the whole group of measures produces an indicators score. The weighting applied included the views of the general community, and key stakeholder and management groups. The three approaches used for the weightings 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., 2014c) and (Pascoe et al., 2016).

For each indicator a given weighting was developed during the pilot phase in 2014 via online surveys using community leaders, and general community. Inputs from 19 marine or coastal-social scientists were used to develop the relationships between measures, indicators and indicator groups.

To aggregate indicator scores into indicator groups and components, a BBN was used. This model was 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. How each indicator combines to inform the objective is determined through a combination of impact weighting and subjective assessment based on expert knowledge. The individual objective performances are aggregated to provide an overall component performance measure (i.e. economic, social, and cultural). A separate BBN was developed for each component.

2.5 Valuation of recreational activity

One of the three economic indicators 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 was devoted to eliciting the non-market economic values of recreation. While it is possible to assess both use and non-use recreation values in a community survey, practical limitations restricted the valuation to focus on use values only. The Travel Cost Method (TCM) was applied as the valuation format.

Travel Cost Method is an important economic non-market evaluation technique developed by Clawson in 1959. It is used to assess the monetary value of natural resources extensively used for recreational purposes (e.g. recreational fishing, beach) that cannot be evaluated through market prices. The key principle behind the TCM is that the cost of travel and time a person incurs to visit a place can be used to assign a dollar value to the place.

The TCM is the standard approach used to estimate recreational values and has been widely used over the past 50 years. However, there have been relatively few recent applications in Australia. The basic concept underlying the TCM is that outdoor recreational benefits at a specific site can be derived from a demand

function relating the number of trips made by visitors to the site, to the actual cost of a visit. Early applications of the TCM employed standard regression techniques to identify the relationship between visit rates and independent variables such as travel costs and population characteristics. Count data models are now commonly applied in travel cost analysis, where the dependent variable is a count that represents discrete events, such as the number of trips. These models differ from the classical regression models in that the response variable is a non-negative and integer-valued probability density. The distribution in count data models is also characterised by higher concentration on lower discrete values (e.g. on one or two trips per year) which is a common feature of individual travel behaviour. These properties have made count data very popular for modelling recreation demand through the individual travel cost models (e.g. Shrestha et al., 2002).

Count data models such as Poisson or negative binomial models can be applied to analyse travel cost data. It is assumed that the dependent variable (number of trips) follows a standard Poisson distribution, where the probability of an individual taking V_i trips can be modelled as:

$$\text{Prob}\ (V = \text{V}_\text{i}) = \text{Exp}(-\lambda_i) * \lambda_i^{V^i}/V_i! \quad (1)$$

where, λ_i is both the mean and the variance of the random variable V (expected number of trips), takes strictly positive values and is a function of all the explanatory variables.

An important property of the Poisson regression models is equi-dispersion and the assumption that the mean is equal to the variance. However, in most travel cost surveys a large number of visitors make only a few trips to the reference site, while a limited number of visitors may visit the site more regularly. As a result, the variance is expected to be significantly higher than the mean, causing a problem in the Poisson models which is known as over-dispersion. Negative binomial models are a more general form of a count data model than the Poisson model, where the assumption about the equality of the mean and variance is relaxed by incorporating an additional error term to account for systematic differences (Haab and McConnell, 2002). An attractive feature of the model is that by assuming that the coefficient on travel cost is representative of cost tradeoffs, the consumer surplus (value) per trip can be simply estimated as:

$$\text{Consumer surplus/trip} = -1/\beta_{\text{travel cost}} \quad (2)$$

2.5.1 Travel cost model

To populate a count data model, it is important to collect information about both the number of trips and the costs of the trips involved. Typically a sample of the population or recreational visitors are surveyed and asked about their frequency of visits to a site, as well as the costs of their average or most recent visit. As it is often difficult for people to identify their travel costs accurately, particularly in general population surveys, it is common to estimate travel costs indirectly as a function of travel distance, vehicle type, and travel time. In this study, where the activity involved the use of a boat, additional information was collected about fuel costs.

Information about trip frequency (in the last 12 months) was collected in a categorical format, with additional information about the associated range provided if required. All information was then adjusted into a non-integer value for analysis (Table 4).

Table 4: Visitation frequency rates in the last 12 months

Response category	Range	# trips per year (rate applied)
4-7 times a week	150-300	225
2-3 times a week	80-149	115
About once a week	40-79	60
About once every 2 weeks	20-39	30
About once a month	7-19	13
About 4-6 times a year	4-6	5
3 times per year	3	3
2 times per year	2	2
About once a year	1	1

Travel costs were estimated indirectly by using information about travel distance, travel time and the method of travel for each respondent. While it is common practice to collect information about a range of different types of vehicle used, in this study, only three categories of travel mode were specified (walk, bicycle or motor vehicle). There were three reasons for this. Firstly, it reduced the complexity of the survey. Secondly, it was difficult to distinguish between small medium and large car sizes in a telephone survey. Thirdly, there was very little differentiation in costs per kilometre vehicle costs specified by the Australian Taxation Office for work-related car expenses (1.6-2.6 litre engine = 76 ¢ and 2.6 litre plus = 77¢). The rates for 2015 remain unchanged from 2014. Costs for smaller vehicles such as motor cycles are lower at 65¢, but these typically comprise a very low proportion of the sample (motorcycles accounted for less than 1% of the total sample in Windle and Rolfe (2013).The transport costs applied are given in Table 5.

Table 5: Vehicle costs by travel methods

Travel method	Cost per km
Walking	$0.00
Bicycle	$0.00
Motor vehicle	$0.765

Respondents who had made a boat trip were asked for details about the distance they travelled and their fuel use or cost. Fuel costs were included in the travel cost assessment for any related recreational trips. No other trip expenditure was included in the analysis. Expenditure on food and incidentals was not counted on the basis that it may have been incurred independently of respondents taking the trip. Some costs, such as bait for fishing, could be considered as trip specific expenditure. However, it is difficult to get accurate cost information about specific items of expenditure as people are more likely to remember their total expenditure, or expenditure on large items such as fuel, which was already taken into consideration.

There is no uniform approach to the treatment of travel time and on-site time in the travel cost literature. There is general agreement that values for recreation time at the travel site should be excluded from the analysis (Rolfe and Gregg, 2012). However, there is little consensus about the treatment of travel time. Some case studies have included travel time as a cost, using some proportion of standard wage rates (e.g. a third). In contrast, Rolfe and Gregg (2012) did not include a cost estimate for travel time, arguing that travel time is often complicated to measure and assess accurately, may be part of the recreation experience, or have minor effects. If the costs of travel time are not included in the travel cost estimate then values for

land-based recreation are based solely on vehicle cost, and people who walk or cycle along the foreshore for recreation (with no vehicle cost) will have no associated travel cost.

In this study, the cost of travel time was included for each adult in the travel group at the rate of one third of the Queensland average hourly earnings (i.e. $34.90 per hour in 2014[2]). A rate of 25% ($8.4 per hour) was also applied in the sensitivity testing.

Multi-destination and multi-purpose trips complicate the estimation of travel cost models, as only a proportion of the travel costs can be attributed to the relevant site. Some people who visit a beach or the harbour may not spend all their time at that site (multi-destination) or visit for other reasons (multi-purpose). To account for this, respondents were asked to indicate the proportion of the total trip time (excluding travel time) that they spent on the recreational activity. This proportion was applied pro rata to the travel cost associated with the trip.

The final travel cost estimate comprised of four components: travel vehicle cost, travel time cost, boat use (fuel) costs and the proportion of time spent at the site.

$$\mathrm{TC}i = \big((\text{distance} * \mathrm{vc}i) + (\text{time} * \$11.63/\text{adult}) + \text{boat cost}\big) * \%\ \text{time at site} \quad (3)$$

Where TC_i is the travel cost for a travel party (travelling in the same vehicle); *distance* is the two-way distance travelled to the site (km); *time* is the two-way time to travel to the site (hrs); and vc_i is the vehicle cost per kilometre for travel method i.

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

Once the travel cost of each trip is established, the total travel cost and other explanatory variables become a function of trip frequency in the travel cost model.

2.6 Secondary economic data sources

To assess the economic health of harbour this report card uses eight indicators which have been aggregated into three indicator groups: economic performance, economic stimulus and economic value. These indicators were developed from the Gladstone Healthy Harbour Partnership (GHHP) vision.

2.6.1 Economic Performance

The economic performance indicator group consisted of three indicators: tourism (expenditure), commercial fishing and shipping activity. These were selected to reflect the key industries using the harbour, and weighted according to economic activity and a survey of local industry and community leaders.

[2] Australian Bureau of Statistics 2014: 63060D004_201405 Employee Earnings and Hours, Australia, May 2014. Australian Bureau of Statistics, Canberra.

Tourism

The report card grade for tourism was based on estimated expenditure on hotel accommodation, food and other local services in the Gladstone Region, as well as the number of visitors to the Gladstone Visitor Information Centre. Data for 2014-15 were compared with 10-year averages (2003-04 to 2012-13). Expenditure data were derived from the Australian Bureau of Statistics Tourism Satellite Accounts.

This measure was a little different to that used in the 2014 Pilot Report Card, in which the total value of tourism was based on accommodation expenditure alone. This change also resulted in tourism having a greater weighting in the overall economic performance indicator group.

Commercial fishing

The report card score for commercial fishing was based on the 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 S30 and the average prices for each species derived from ABARES fisheries statistics (Skirtun et al. 2013)[3]. These prices relate to 2012-13, 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 collected from within Grid S30 over the period 1990-91 to 2014-15 were used as the basis for comparison. This grid includes Gladstone harbour and the open coastal waters immediately adjacent to the harbour (see Figure 4). 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 2014-15 was estimated based on catch by fishing method data from the QFish database.

[3] Average price derived from ABARES fisheries statistics. Skirtun, M., Sahlqvist, P. and Vieira, S. (2013). Australian fisheries statistics 2012, FRDC project 2010/208. ABARES, Canberra.

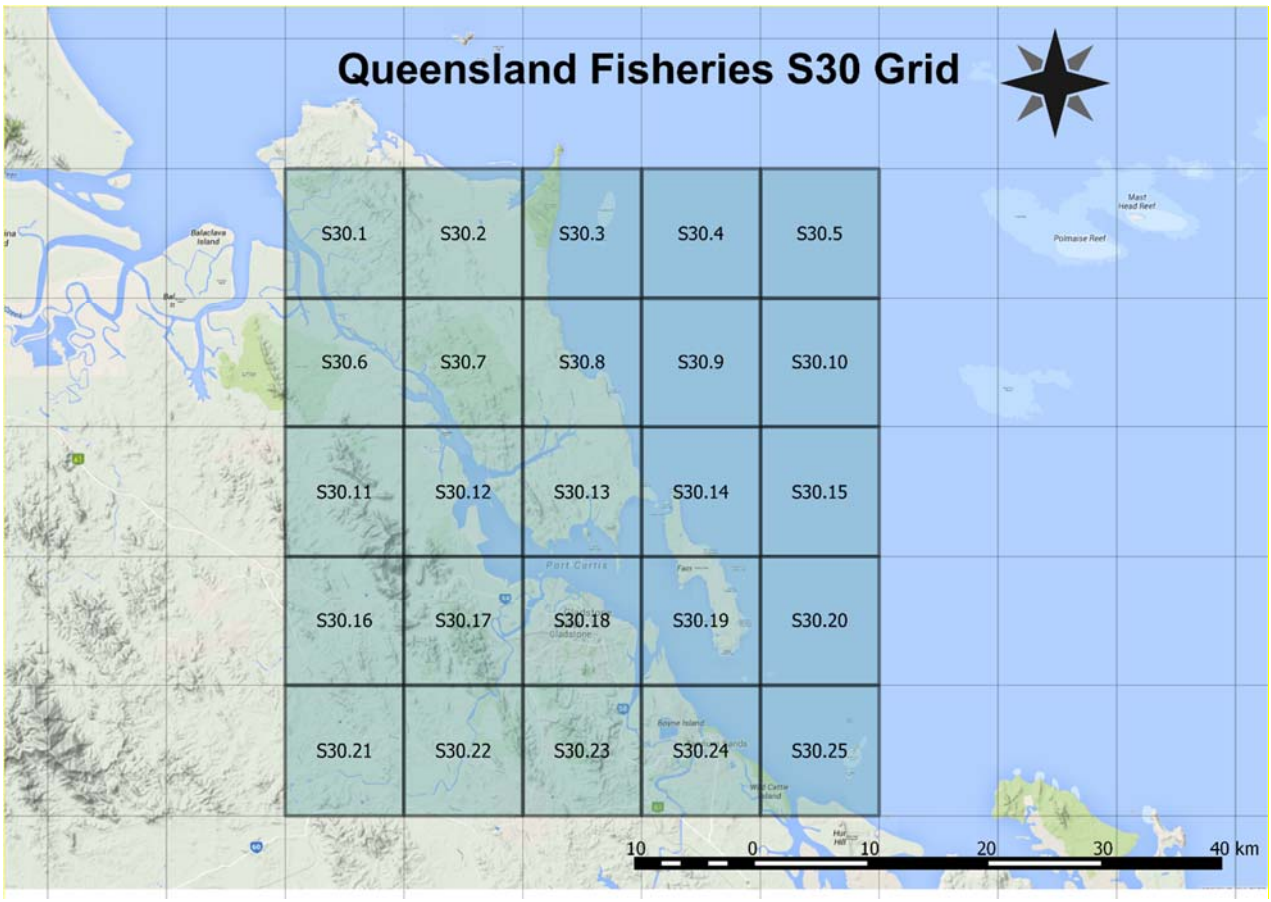


Figure 4: The Queensland Fisheries S30 Grid (base map provided by Dr Mark Shultz at GHHP).

Shipping

Capacity utilization is an approach to measuring the performance of an industry for a given time period. It is often expressed as a percentage. Two common reasons for increased capacity utilization include increased market demand and availability of new technology to produce more. Reasons for decreased capacity utilization often include seasonal variations, reduction in market demand or reduced production. For example, a factory produces cement. It has a maximum output of 10,000 kg per month. During January, the actual output was 5,000 kg of cement. So what was the capacity utilisation in January? It can be calculated as a percentage using the following formula,

$$\text{Capacity utilisation} = \frac{\text{Actual level of output } (5{,}000)}{\text{Maximum possible output } (10{,}000)} \times 100 \qquad (4)$$

$$= 50\%$$

Data on monthly shipping movements by cargo type, destination and origin were provided by the Gladstone Ports Corporation. The report card score for shipping activity was based on capacity utilisation (current level of activity relative to potential level of activity). Data for the 2014-15 financial year were used in this report card. Shipping activity from 2006-07 to 2014-15, and potential future shipping activity related to developments on Curtis Island and at Fisherman's Landing were used as the basis for comparison.

2.6.2 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 March 2015 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 September 2015. 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 Australian Bureau of Statistics (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 economic performance related indicators.

2.6.3 Economic Value (Recreation)

The economic value (recreation) indicator group was assessed through three indicators, land-based recreation, beach recreation and recreational fishing. As in 2014, the measures of economic value (recreation) were a combination of the average economic value per different type of trip (which was used to weight the contributions of each component), and the level of satisfaction experienced by those who undertook the activity. The study this year focused on estimating a value for recreational fishing, which was under-represented in the 2014 survey.

Information on the non-market economic value (recreation) of harbour area activities was collected through a community survey of 400 people within the Gladstone region conducted in September 2015. Data on travel costs, travel time and other access and site costs were used in Travel Cost Method (TCM) to calculate the economic value of using a recreational site based on the investment that people have made. Full travel cost information was only collected for recreational fishing with details provided about the last trip made.

Land-based recreation activities included activities like walking, running, cycling, cycling, picnicking or barbecuing, relaxing by the water, community and sporting events. The total annual value of beach recreation and other land-based recreation was estimated from the information collected about trip frequency and trip satisfaction (this survey) and the travel cost values elicited from the 2014 community survey for the 2014 GHHP Pilot Report Card.

3 Results

The results for this project are provided in the following subsections. Initially we provide an overview of the demographics of the community CATI survey respondents before displaying the outcomes of the word cloud analysis. Section 3.3 explains the results of the fishing, land-based and beach recreation value estimates conducted in this study. The remaining sections address the specific results of the social, cultural and economic components.

3.1 Key demographics of the CATI community survey respondents.

The survey respondents were evenly divided by gender, 49.5% male and 50.5% female, and while responses were obtained from all age groups, fewer respondents were obtained from the younger age categories, 18 – 24 (<5% of respondents) and 25 – 34 (<10% of respondents). Thirteen percent of participants identified themselves as Traditional Owners of the area.

Survey participants were from a broad range of income categories from less than $20,799 per annum to greater than $156,000 per annum. Across all categories the proportions of respondents were broadly consistent with the Australian Bureau of Statistics 2011 census data for the Gladstone LGA with exception of the individual income bracket of $130,000 - $155,999 which was under-represented (Table 6). The majority of survey participants owned their homes without a mortgage (45%) or with a mortgage (41%), while 14% were renting. The vast majority (97%) of households owned a car.

Table 6: Comparison of household income distribution between the community CATI survey and Australian Bureau of Statistics 2011 census data from Pascoe et al. 2014a).

Individual income		CATI survey (2014)	CATI survey (2015)	ABS census (2011)
Annual	Weekly			
Less than $20,799	Less than $399	12%	13%	8%
$20,800 – $41,599	$400 – $799	13%	12%	13%
$41,600 – $64,999	$800 – $1249	10%	11%	12%
$65,000 – $77,999	$1250 – $1499	5%	7%	7%
$78,000 – $103,999	$1500 – $1999	18%	14%	15%
$104,000 – $129,999	$2000 – $2499	12%	14%	11%
$130,000 – $155,999	$2500 – $2999	11%	8%	16%
Greater than $156,000	Greater than $3000	20%	21%	20%

3.2 Word Cloud results

An additional question was asked of respondents in this year's CATI survey; respondents were asked to give one (or up to three) words to describe the change in harbour health as compared to in 2014. Just over two thirds of respondents said that overall the condition of the Gladstone Harbour area was the same. The response to the new question in the survey of whether the harbour health had changed from this year to last resulted in 68% of survey participants responding that there was no change.

Word clouds enable the visual identification of key recurring issues or themes in an area. At the start of the community 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 involved the following steps. Responses with two or more words were hyphenated to create one word, all entries of the word 'none' were removed as they indicated a respondent did not give three words. All spelling errors were corrected. Some prepositions were also 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 frequently used as the response to this survey question. The word cloud produced and shown in Figure 5 is based on the first word provided by the respondent.

The results suggest that while most people view the area positively as an area of beauty, negative attributes such as pollution, busy, fishing and industry are also predominate features of the word clouds. The word cloud produced from the combination of the first three words provided by the respondent to this question is shown in Figure 6.

Figure 5: First word response from CATI survey respondents analysed and compiled into a word cloud (size indicates frequency of word).

Figure 6: All three word response from CATI survey respondents analysed and compiled into word cloud (size indicates frequency of word).

3.3 Recreation activity and valuation results

A section of the community CATI survey was devoted to eliciting the economic values of recreational activity. The Travel Cost Method was applied as the valuation format. Negative binomial models are used to analyse the travel cost data under the assumption that the total travel cost and other explanatory variables are a function of trip frequency. Full details are outlined in the methodology section.

In the 2015 survey, details about the frequency of recreational use of the harbour area (in the last 12 months) were collected for three separate types of activity: beach recreation, land-based recreation and recreational fishing. Full travel cost information was only collected for recreational fishing with details provided about the last trip made.

The total annual value of beach recreation and other land-based recreation was estimated from the information collected about trip frequency and trip satisfaction (this survey) and the travel cost values elicited from the 2014 community survey for the 2014 Report Card (Pascoe et al. 2014a).

A total of 400 responses were collected in the 2015 Gladstone community survey. Only 29 respondents (7%) had not visited the Gladstone harbour area in the last 12 months, and 344 respondents (86% as compared to 87% in 2014) had visited the harbour for recreational purposes.

The majority of respondents (68%) indicated that their recreational use of the harbour had not changed in the last 12 months with a similar proportion reporting increased use (15% as compared to 9% in 2014) and decreased use (17% as compared to 24% in 2014). In contrast to the 2014 results, there was no significant influence of age in those who reported a reduction in recreational activity, but older respondents were less likely to have reported an increase in activity[4].

[4] Two new age groups created: 1. = 45 plus years; 2= 55plus 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 10% level respectively.

In the last 12 months, there had been little change in use of boat ramps.

- 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 95% of respondents had participated in land-based and beach recreation, but only 38% had been recreational fishing. Details of trip frequencies for the different activities are provided in Table 7 and a comparison with frequencies reported in 2014 provided in Figure 9. There appears to have been very little change in the frequency of recreational activity in the harbour over the previous year, with the average frequency rates for the total sample remaining very similar (Figure 9). The small increase in frequency of beach recreation from 2014 was not statistically significant.

Table 7: 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	14	3.7	17	4.4	1	0.3
2-3 times a week	115	16	4.2	20	5.2	2	0.5
About once a week	60	40	10.6	44	11.5	13	3.3
About once every 2 weeks	30	50	13.2	61	15.9	23	5.8
About once a month	13	105	27.8	117	30.5	39	9.8
About 4-6 times a year	5	64	16.9	62	16.1	32	8
3 times per year	3	18	4.8	12	3.1	7	1.8
2 times per year	2	36	9.5	29	7.6	20	5
About once a year	1	21	5.6	17	4.4	16	4
Never	*0*	*14*	*3.7*	*5*	*1.3*	*246*	61.7
Total		**378**	**100**	**384**	**100**	**399**	**100**
Missing values		*22*[1]		*16*[1]		*1*[2]	

[1] A sampling error - respondents were not asked

[2] Incomplete information on frequency for one respondent who had been recreational fishing

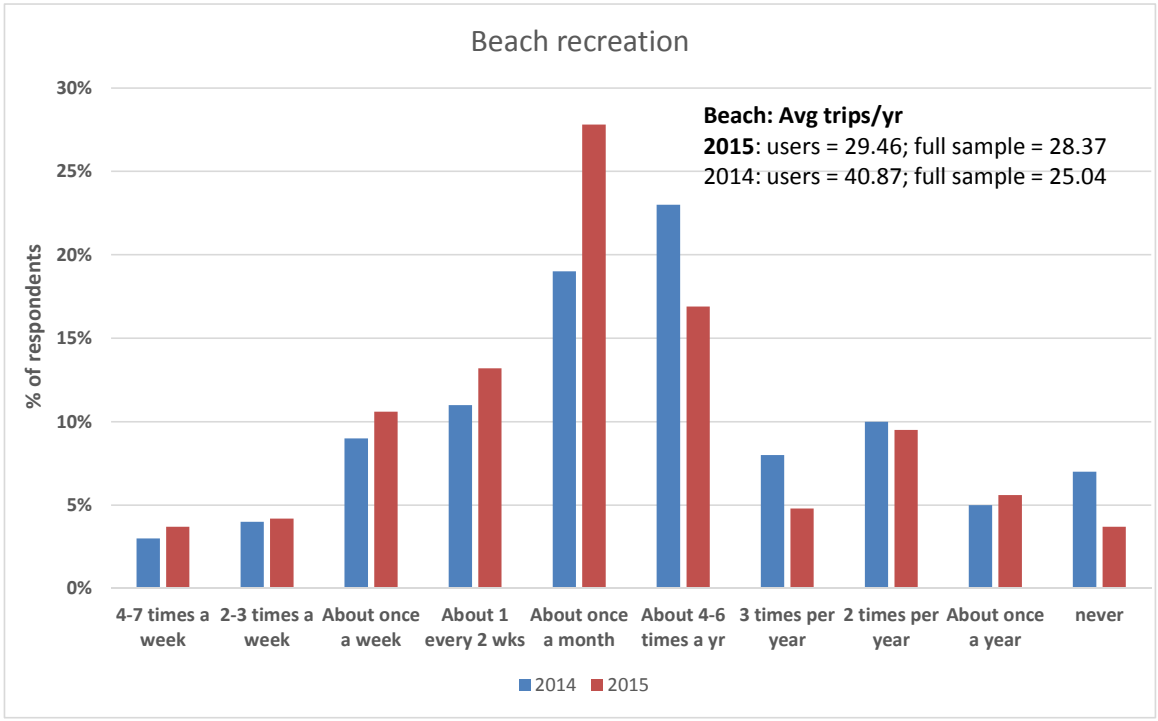


Figure 7: Beach recreation trip frequency rates: 2014 -2015 comparison

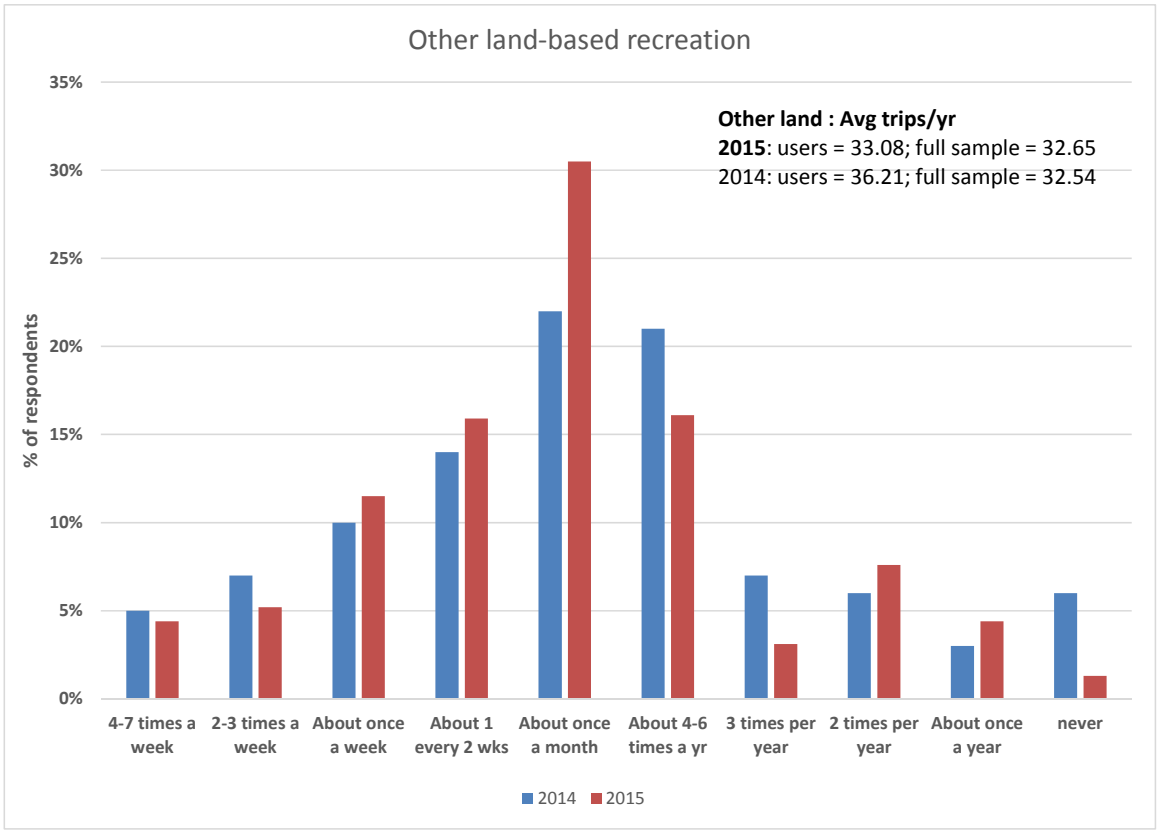


Figure 8: Other land-based recreation trip frequency rates: 2014 -2015 comparison

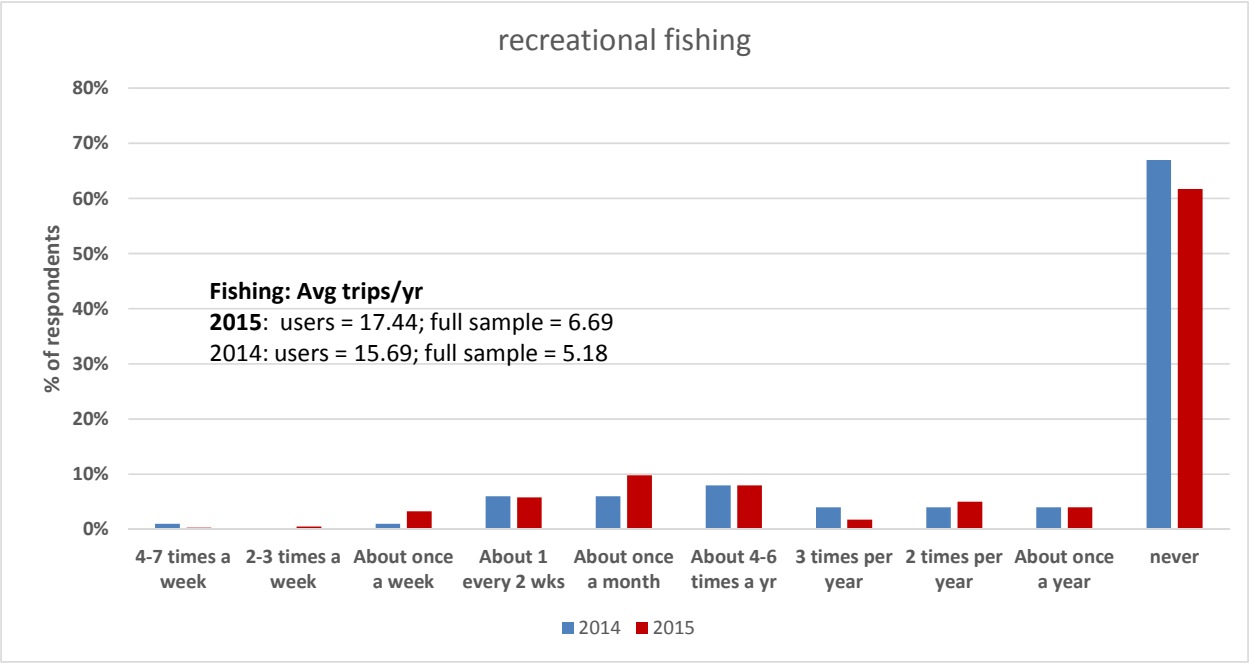


Figure 9: Recreational fishing trip frequency rates: 2014 -2015 comparison

Other general warm-up questions indicated that Tannum Sands and Spinnaker Park artificial beach and Boyne Island were the most popular beaches to visit (Figure 10); and walking, picnicking and relaxing were the most popular land-based recreational activities (Figure 11). There was little change (no statistically significant differences) from the 2014 survey results.

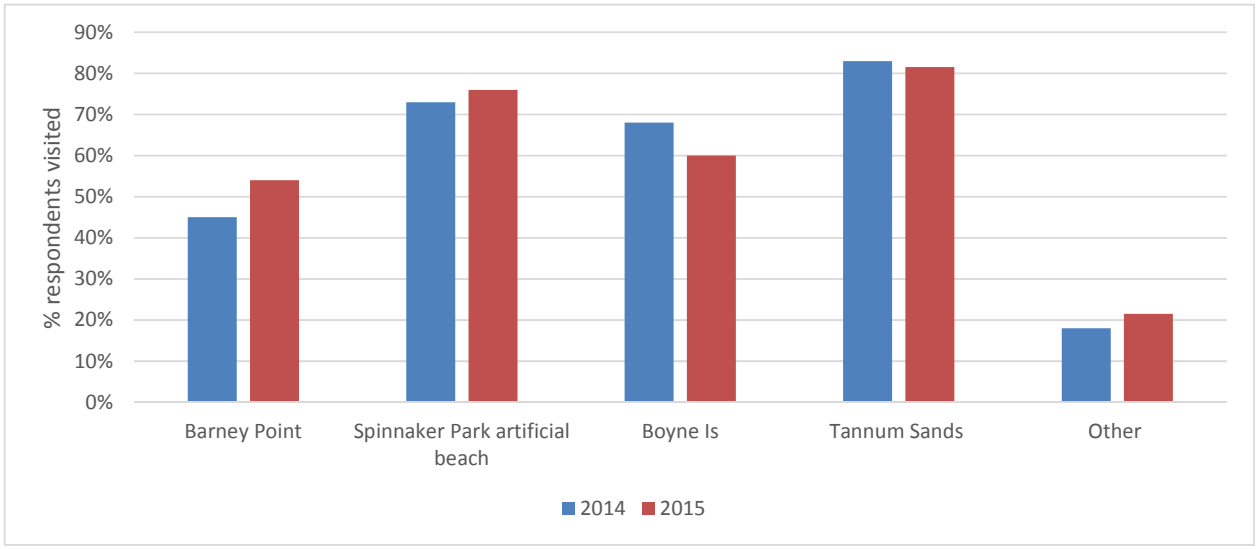


Figure 10: The most popular beaches visited by surveyed Gladstone residents

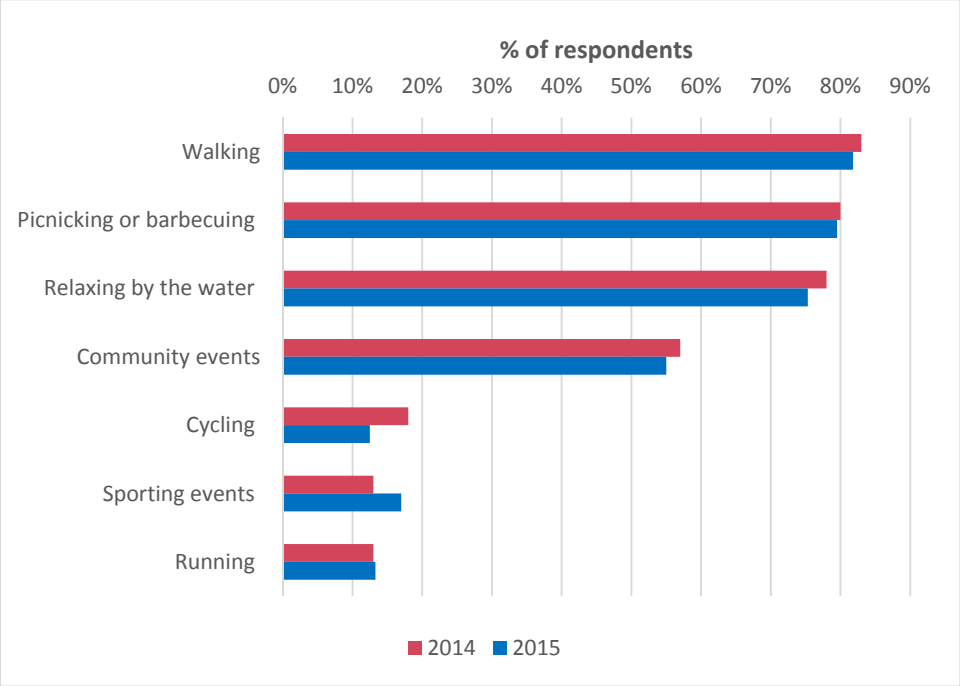


Figure 11: Popular land based activities listed by recreational visitors

3.3.1 Overview of valuation results

In the 2015 survey full details were only collected for recreational fishing trips. While it was the intention to collect information about both boat-based and shore-based recreational fishing, there was a sampling error that meant that the extent of shore-based fishing was not fully captured in the sample. Full details were collected from 154 (38%) respondents, with the following summary details:

- Travel mode: 97% reached the harbour by car; and 3% walked.
- The average one-way travel distance was 9.11 km, ranging from 0 to 50 km.
- The average one-way travel time was 12.41 minutes, ranging from 1 to 60 mins.
- The average # adults per trip was 2.4, ranging from 1 to 7.
- The average # children per trip was 0.7, ranging from 0 to 5.
- Most trips (n=108) involved the use of a boat and 46 trips did not.
- The average cost of boat fuel (n= 108) was $48.15 per trip, ranging from $0 to $500.
- Most respondents (91%) spent all their time on the recreation activity.

3.3.2 Travel cost data analysis and model development

The data were analysed using ©LIMDEP statistical software and all models were developed using ©NLogit5. Negative binomial models were applied to analyse travel cost data. Once the travel cost of each trip is established, the total travel cost and other explanatory variables become a function of trip frequency in the travel cost model. Details of the trip frequencies applied in the travel cost analysis are outlined in Table 7 and also presented in Figure 12. One case with insufficient information was removed from the analysis.

There was considerable heterogeneity in the travel costs associated with recreational fishing trips, particularly in the lower frequency trips. In an exploratory analysis of the data, six cases had to be removed (identified in Figure 12) to ensure the trip travel cost was significantly related to trip frequency. The very

high cost (over $500) trip could have been considered an 'outlier' but needed to be retained in the model to ensure the significance of the travel cost variable. The cost was not unreasonable with a frequency of only once a year. A larger sample size would have helped smooth some of the heterogeneity within the sample and helped to decrease the influence of these 'outlying' values.

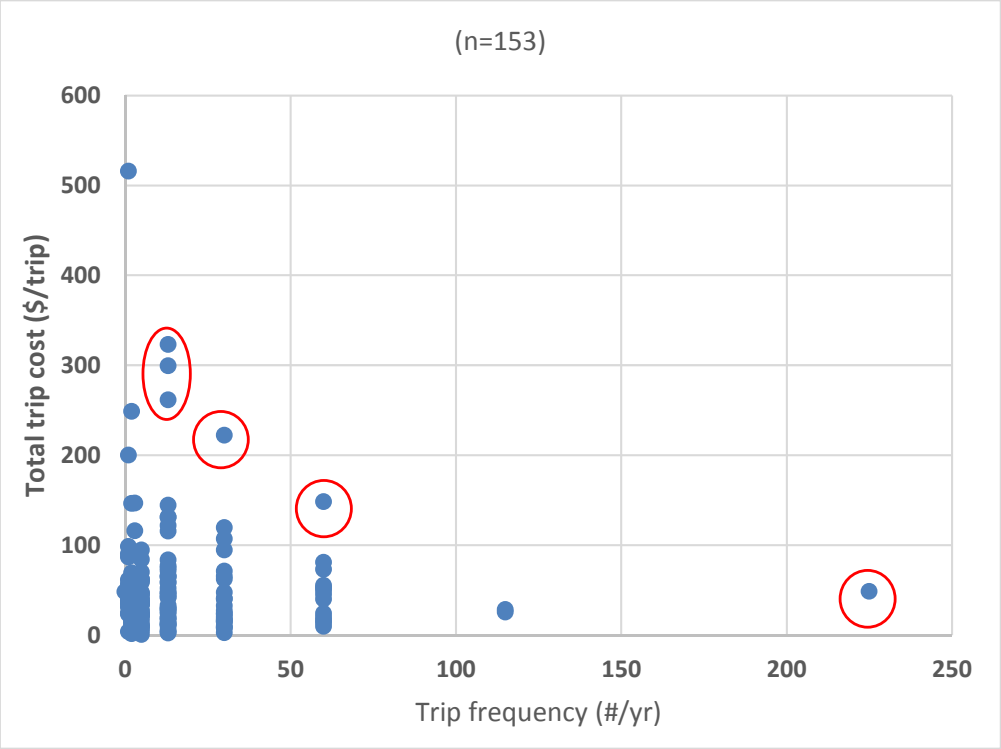


Figure 12: The relationship between total trip cost and trip frequency

In the exploratory analysis, a range of socio-demographic variables were included in the travel cost models with varying degrees of influence. The intention was to determine which variables had a consistent influence on the dependant variable (trip frequency). Variables were included in a stepwise manner and if significant they were retained and removed if not significant. Only three variables were found to be significant, but were not significant when combined.

Age generally was not a significant influence on trip frequency, but a dummy variable for those over 45 years was significant and positive, indicating people in that age group went fishing more frequently than younger people.

In a separate model, the amount of time people had lived in the Gladstone region (also related to age) as well as the satisfaction rating were both positively related to increased trip frequency. The variables were not significant in other combinations. Both models are presented below for interest (Table 8). By including the 45 plus age group produced a stronger model. The positive influence of the satisfaction rating is also of interest since it is applied to determine the report card grade (i.e., A, B, C, D, or E).

Both the final travel cost models (Table 8) are significant with high Chi square values (2149 and 2107 respectively). Both models have highly significant Alpha values indicating over-dispersion and supporting the application of negative binomial models. As required, travel costs were a significantly negative influence on trip frequency (the dependent variable). In other words, as travel costs increase, trip frequency decreases.

Table 8: Recreational fishing travel cost (zero truncated negative binomial) models

		Model 1			Model 2		
Variable	*Description*	*Coefficient*		*St Err*	*Coefficient*		*St Err*
Constant		2.3044	***	0.2707	1.3865	**	0.5862
Cost per trip	Total cost of trip per group	-0.0068	**	0.0033	-0.0062	*	0.0033
Age 45+[1]	Dummy variable (grouping all participants over 45 years)	0.6847	***	0.2432			
Yrs in area[1]	Years respondent lived in Gladstone region				0.0143	*	0.0083
Satisfaction rating	Score from 1=very unsatisfied to 10=very satisfied				0.1221	**	0.0590
Alpha	*Dispersion factor*	2.1957	***	0.6230	2.1476	***	0.6019
Model statistics							
Sample size		147			147		
Log Likelihood		-530			-530		
AIC/N		7.27			7.28		
McFadden R^2		0.670			0.665		
Chi^2		2149			2107		

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

[1] Details are provided in the summary information for the community survey

The value estimates for recreational trips were calculated with the constant and travel cost variable only to reduce any confounding effect of the socio-demographic variables across different models.

The mean value of a recreational fishing trip is estimated at $143.16 per trip, ranging from $73 to over $4000 per trip. The very upper range value is indicative of the heterogeneity (or dissimilarity) in the data and partly driven by the few very high cost trips. On average each trip included 2.37 adults, with an average trip cost per adult of $60.40.

To extrapolate (scale up) 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 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 24,480 households in Gladstone, based on an average household size of 2.7 persons and a population of 66,097 in 2014 (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 47,590 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 presented in Table 9 and summarised below:

1. The value of a recreational fishing trip is estimated at $143 per trip.
2. The value of a trip per adult is estimated at $60 per trip per adult.
3. The annual value of recreation trips for the Gladstone population is estimated at $23.45 million (applying the household extrapolation method).

4. The annual value of recreation trips for the Gladstone population is estimated at $19.23 million (applying the per adult extrapolation method.
5. The average annual value of recreation trips for the Gladstone population is estimated at **$21.34 million** (average of the two extrapolation methods).

Table 9: Value estimates for recreational fishing trips

1. Total annual value of recreational trips (per household extrapolation)		**(95% CIs)**
Mean trip value	$143.16	($73-$4,137)
***Users:* Avg # trips per year (n=153)**	17.44	
***Full sample*: Avg # trips per year (n=399)**	6.69	
Annual value of recreation trips (*Full sample*)	$958	($487-$27,677)
***Gladstone population*: # households**	24,480	
***Gladstone:* annual value of recreation trips *(full sample: per household extrapolation*)**	**$23.45M**	**($12M - $678M)**
2. Total annual value of recreational trips (per adult extrapolation) per adult		
Avg # adults per trip	2.37	
Mean trip value per adult	$60.41	($31 - $1,746)
Mean annual value per adult *(full sample)*	$404	($206- $11,678)
***Gladstone population*: # adults 18-80 yrs**	47,590	
Gladstone:* annual value of recreation trips *(full sample: per adult extrapolation)	**$19.23M**	**($10M - $556M)**

As was the case with the 2014 data, sensitivity testing indicated there was little variation in recreation value when instead of apportioning the cost of travel time at one third of the Queensland average hourly earnings ($34.90), a rate of 25% ($8.725 per hour) was applied. The average trip value increase slightly from $143 per trip to $145 per trip and no further details are presented.

3.3.3 Summary of fishing, land-based and beach recreation value estimates

To estimate the 2015 values for beach and other land-based recreation, the 2014 estimates for the mean trip values are applied as they are unlikely to have changed in a single year. These values are then updated by applying the trip frequency information collected in the 2015 survey and extrapolated with updated information about the Gladstone population. The results are summarised in Table 10.

In the past year there has been little change in the total value of beach and land-based recreation to the Gladstone community. Values generally have increased in line with the population increase. In addition, there is also a small increase in the value of beach recreation as a result of an increase (not statistically significant) in trip frequency from 25 trips per year to 29 trips per year.

The value of a recreational fishing trip is much higher than other forms of recreation, but the frequency is much lower, which means the total value of recreational fishing trips is lower than that of beach recreation and approximately half that of land-based activity.

Table 10: Summary recreation value estimates

	Recreational fishing	Land-based recreation	Beach recreation
Trip value (CIs)	$143 ($73-$4,137)	$61 ($48 - $85) [1]1	$40 ($26 - $105) [1]
***Full sample*: Avg # trips/yr**	6.69	32.65 (2014=32.54)	28.37 (2014=25.04)
Annual value per trip *(full sample)*	$958 ($488-$27,677)	$2,006 ($1,567 - $2,775)	$1,141 ($738 - $2,979)
Gladstone: Annual value of recreation trips	*$23.45 million* *($12M-$678M)*	*$49.11 million* *($38M - $68M)*	*$28 million* *($18M - $73M)*
Trip value/ adult (CIs)	$60 ($31-$1,746)	$27 ($20 - $42) [1]	$21 ($13 - $46) [1]
Mean annual value per adult *(full sample)*	$404 ($206-$11,678)	$877 ($653 - $1,371)	$589 ($369 - $1,305)
Gladstone: Annual value of recreation trips	*$19.23 million* *($10M-$556M)*	*$42 million* *($31M - $65M)*	*$28 million* *($18M - $62M)*
Gladstone: Avg Annual value of recreation trips (CIs)	**$21.34 million** ($11M - $617M)	**$45.43 million** ($35M - $67M)	**$27.98 million** ($18M - $68M)

[1] Estimates from 2014 Report Card

It should be noted that in the 2014 analysis it had not been possible to estimate separate travel cost models for recreational fishing. Instead, the trip value ($104/trip) and trip frequency (33-41 trips/year) details for general recreation were applied, with a total annual value estimated at $84 million. The satisfaction scores for recreational fishing were applied to obtain the relevant (ABCDE) grade. The results outlined above suggest this total value was inflated because the inclusion of the higher cost recreational fishing trips inflated the average per trip value of recreation. Also, the average trip frequency was inflated compared to the trip value. The difference in the two results should act as a caution when mixing high and low cost trips in a travel cost model as it increases the heterogeneity in the analysis and a larger sample size is required for more accurate results.

3.3.4 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 2014 ratings are presented in Figure 13.

Overall, respondents reported high levels of satisfaction with a mean scores of 7.65, 7.89 and 7.72 for beach recreation, other land-based recreation and recreational fishing respectively. There was no change in mean rating scores for beach recreation from 2014. Satisfaction with land-based recreation was significantly lower (one sample T test at the 5% level) than last year's score of 8.2. Satisfaction with recreational fishing was significantly higher (one sample T test at the 5% level) than last year's score of 7.2. However, sample sizes were much smaller for the different types of recreational activity in 2014.

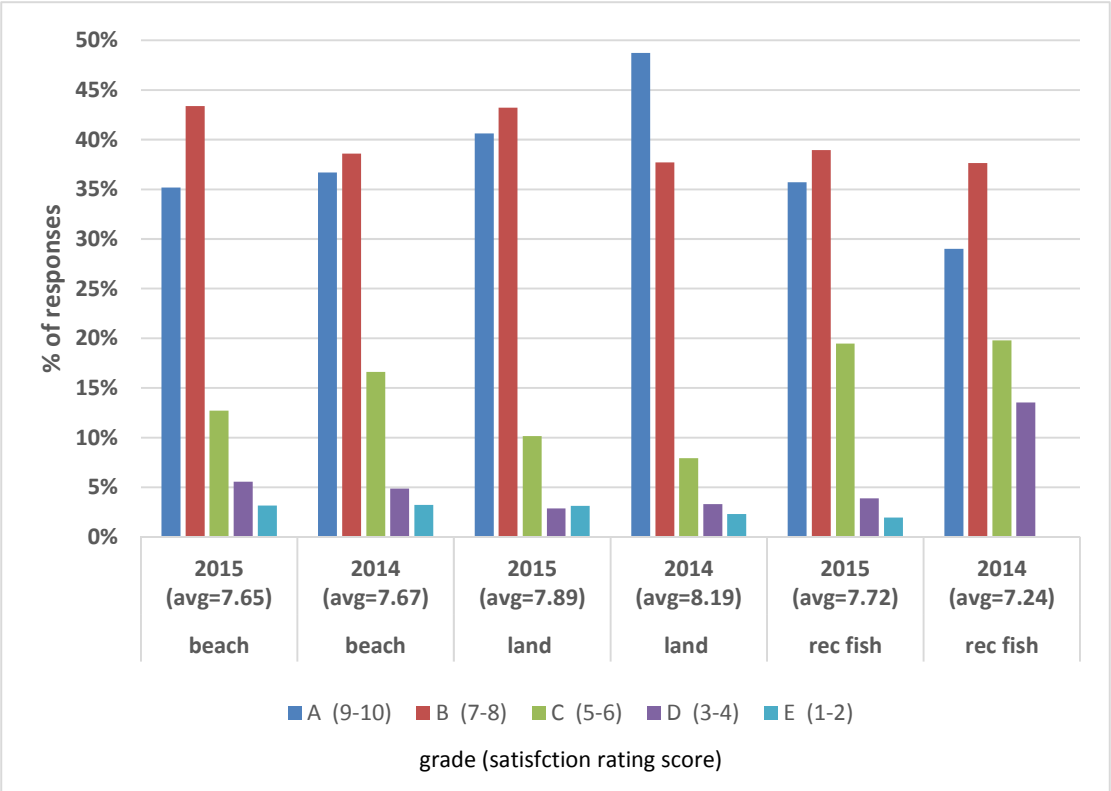


Figure 13: Satisfaction ratings and grades for recreational activity

There are two caveats to consider in applying these results, which were also identified in the 2014 report. First, the community 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, with a focus only on recreational fishing, the results indicated that people over 45 years were significantly (p=0.0049) associated with higher trip frequency rates. It should also be noted that in both the 2014 and the 2015 surveys, the length of time people had lived in the area (also partially related to age) was significantly (p=0.0239 and 0.0852 respectively) associated with higher trip frequency rates.

Second, the sample size for recreational fishing in the 2014 survey had been too small to provide significant models. To supplement the data, in the 2015 survey, information was only collected about recreational fishing and 154 responses were collected. 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 and larger sample sizes are required to improve the accuracy of the analysis.

3.3.5 Development of recreational measures

For the report card analysis, the values per trip for the beach, land and fishing recreational activities (and their associated standard errors) were used to develop the conditional probability tables linking the measure to the sub-component, effectively weighting each measure by its relative (non-market) value. The measures used were the level of satisfaction with each of the recreational activity derived from the CATI survey, based on a 10-point satisfaction scale.

3.4 Social component results

Most social indicator results are qualitative in nature and were directly converted to A to E grades (A = 9-10: Very good, B=7-8, C=5-6, D=3-4, E=1-2: Very poor, on the satisfaction scale) from the CATI survey responses based on participants' satisfaction scale. The distribution of the 10-point scale was used as the baseline for all measures, except for oil spills and marine safety incidents (for more details see Table 1).

The overall grade for the social component of the 2015 Gladstone harbour report card was a C. The overall grade was calculated based on the scores of harbour usability, harbour access and liveability and wellbeing related indicators. The social component grade remained unchanged as compared to the previous year (score 0.58 in 2014) with a score of 0.64.

Harbour usability received a score of 0.75 (0.60 in 2014)**.** The improved score was due to a decline in oil spills and changes in the way shipping safety incidents are reported, to be in line with Commonwealth regulations. Overall this grade was affected by measures related to the harbour safety, i.e., marine pollution and marine safety incidents. It is important to understand that the score for harbour usability (as for all indicator groups) is calculated using Bayesian statistics (not averages) both the social indicators as well as the measures. For the full details of calculated scores, see Section 4.1 and the scores for all the measures, indicators and indicator groups are provided in Figure 26: Bayesian Belief Model results for Social indicator group, including distributions for the GHHP 2015 report card. In addition we remind the reader that the scores for social indicators are not given a grade as compared to indicator groups, which receive a score and a grade.

Table 11: Comparison scores for the social indicators in the 2015 Gladstone Harbour report card.

Indicator Groups		Score/ Grade	Social indicators	Score
Social health (C)	Harbour usability	0.75 B	Perceptions of harbour safety	0.72
			Harbour recreational facilities	0.69
			Perceptions of air and water quality	0.52
	Harbour access	0.62 C	Satisfaction with access	0.68
			Satisfaction with boat ramps	0.62
			Perceptions of harbour health	0.58
			Perceptions of barriers to access	0.61
	Liveability/Wellbeing	0.64 C	Liveability /Wellbeing	0.64

3.4.1 Harbour usability

The harbour usability indicator group comprised three indicators: perceptions of harbour safety for human use, perceptions of air quality (in the harbour area) and water quality, and satisfaction with harbour recreational activities. Community satisfaction with harbour usability was primarily assessed through the CATI survey. The harbour usability survey questions related to people's satisfaction with their last trip to the harbour, quality of ramps and facilities, satisfaction with air and water quality, safety at night and whether people were happy to eat seafood from the harbour. Secondary data on marine pollution and marine safety incidents (sourced from Maritime Safety Queensland, Department of Transport and Main Roads) were also incorporated as measures into the final score.

The sub-indicator of perceptions of harbour safety received a score of 0.72 (greatly improved as compared to 0.38 in 2014) while harbour recreational facilities scored 0.69 (similar to 0.70 in 2014) and perceptions of air and water quality scored 0.52 (a little improved from 0.46 in 2014).

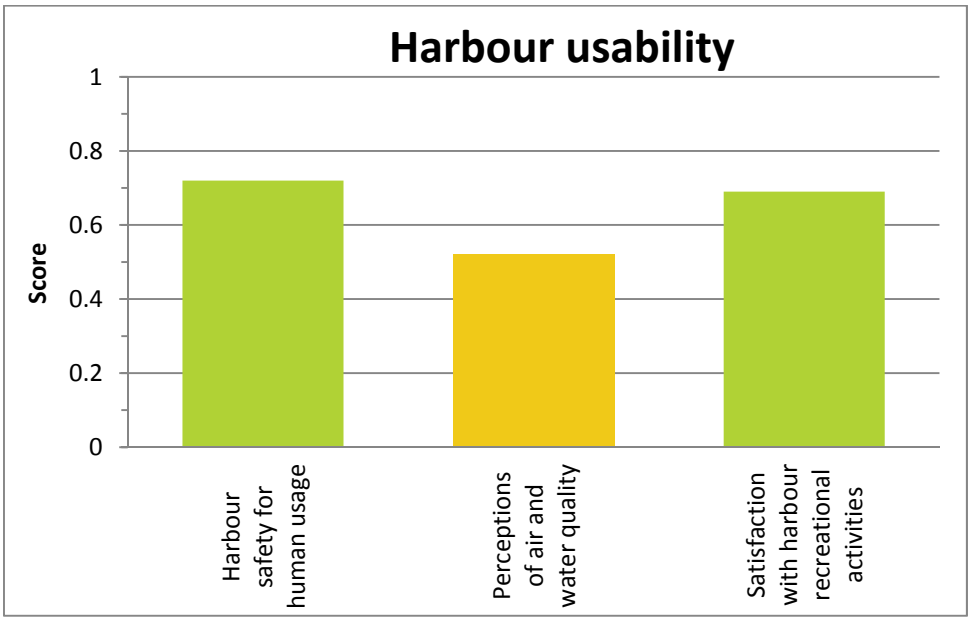


Figure 14: Scores for harbour usability measures for the 2015 Gladstone Healthy Harbour report card

More generally, the survey respondents who had visited the Gladstone harbour area for recreation most (87%) were satisfied with the trip. However, perceptions of the usability and condition of the harbour were more variable. Most participants (73%) were satisfied with the quality of boat ramps, but there was only just under half of the respondents (48%) that were not concerned about marine debris and litter. Almost half (49%) of the respondents agreed the water quality was satisfactory but only 36% thought the air quality was satisfactory in the harbour area. A majority of respondents (61%) were happy to eat seafood caught in the harbour area and 63% felt safe being in the harbour area at night.

3.4.2 Harbour access

Of the three indicator groups, harbour access received a score of 0.62 (as compared to 0.61 in 2014) with most survey respondents satisfied with their level of access to the harbour, their most recent trip to the area and the quality of ramps and facilities.

The harbour access indicator group comprised four indicators: satisfaction with access to harbour, satisfaction with boat ramps/public spaces, perception of harbour health and perception of barriers to access. This indicator was primarily assessed through the participant responses in the CATI survey. The harbour access survey questions covered frequency of harbour use, number of boat ramps, access to public spaces, shipping and recreational boating. People responded on a ten point scale from strongly agree to strongly disagree, where strongly agree equates a score of ten and strongly disagree equates to a score of one.

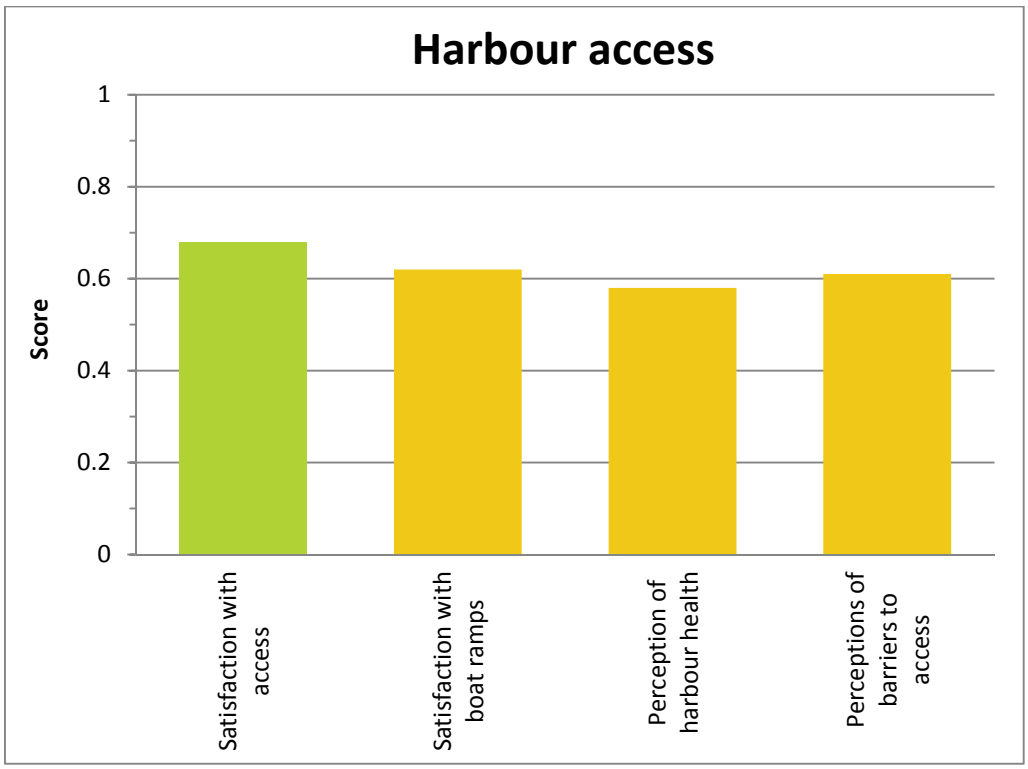


Figure 15: Scores for harbour access measures for the 2015 Gladstone Healthy Harbour report card

Ninety three percent of people surveyed had visited the harbour in the previous 12 months and most of those people (86%) had visited Gladstone harbour for recreational purposes. About 68% of respondents had visited about the same level of frequency as in year 2014 (15% had visited more frequently, 17% less frequently). Most survey respondents (79%) believed they had fair access to the harbour, 82% were satisfied with the level of access to public spaces and 71% were satisfied with the number of boat ramps. A majority (66%) believed that the harbour was in great condition and about 63% were optimistic about the future health of the harbour. A slight majority (57%) believed that the health of the harbour had improved in the past year (an increase from 48% in 2014). A slight majority of respondents (57%) agreed that the amount of shipping had reduced their access (a decrease from 71% in 2014). Most (72%) agreed the amount of recreational boating had not reduced their use of the harbour area. Further, most (79%) respondents indicated that marine debris did not affect their access or frequency of harbour use. However, less than half of the people surveyed (45%) felt that they were able to have input into the management of Gladstone harbour if they chose to.

3.4.3 Liveability and Wellbeing

Liveability and wellbeing received a score of 0.64 (the same as 2014) with most people agreeing that the harbour improves their liveability and wellbeing. This indicator looks to measure the contribution of the harbour to liveability and wellbeing in Gladstone and this is measured through the annual community CATI survey. The liveability and wellbeing survey questions related to whether Gladstone harbour makes living in Gladstone a better experience and the level of participation in community events. Seventy percent of people surveyed agreed that Gladstone harbour makes living in Gladstone a better experience. Just over half (53%) of the respondents regularly participated in community events in the harbour area.

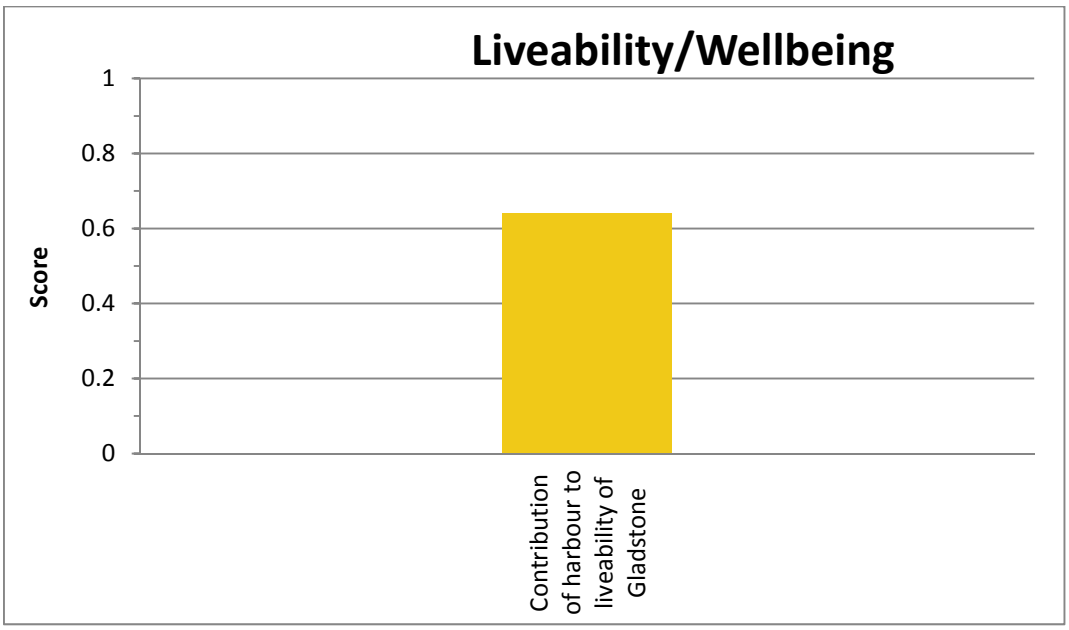


Figure 16: Scores for liveability and wellbeing measures for the 2015 Gladstone Healthy Harbour report card

Gladstone community events are well attended and some of the most popular include EcoFest, Gladstone seafood festival, Gladstone Harbour festival and the Boyne Tannum Hook Up. A detailed overview of the many community events in Gladstone was provided in Pascoe et al. (2014c).

3.5 Cultural component results

Most cultural indicator results were qualitative in nature and were directly converted to A to E grades (A = 9-10: Very good, B=7-8, C=5-6, D=3-4, E=1-2: Very poor, on the satisfaction scale) from the CATI survey responses based on participants' satisfaction scale. The distribution of 10-scale was used as the baseline for all measures.

All data for the sense of place indicator group were collected through the CATI survey similar to social data. There were 15 questions dedicated to gather community views on six cultural indicators. Participants used a 10-point agree-disagree scale to produce quantifiable results. The data was collected from the Gladstone region during the CATI survey conducted in September 2015.

We employed sense of place as a broad construct, which is assumed to incorporate elements of both place identity and place attachment. Sense of place may also provide a useful basis to explore the concept of 'stewardship'.

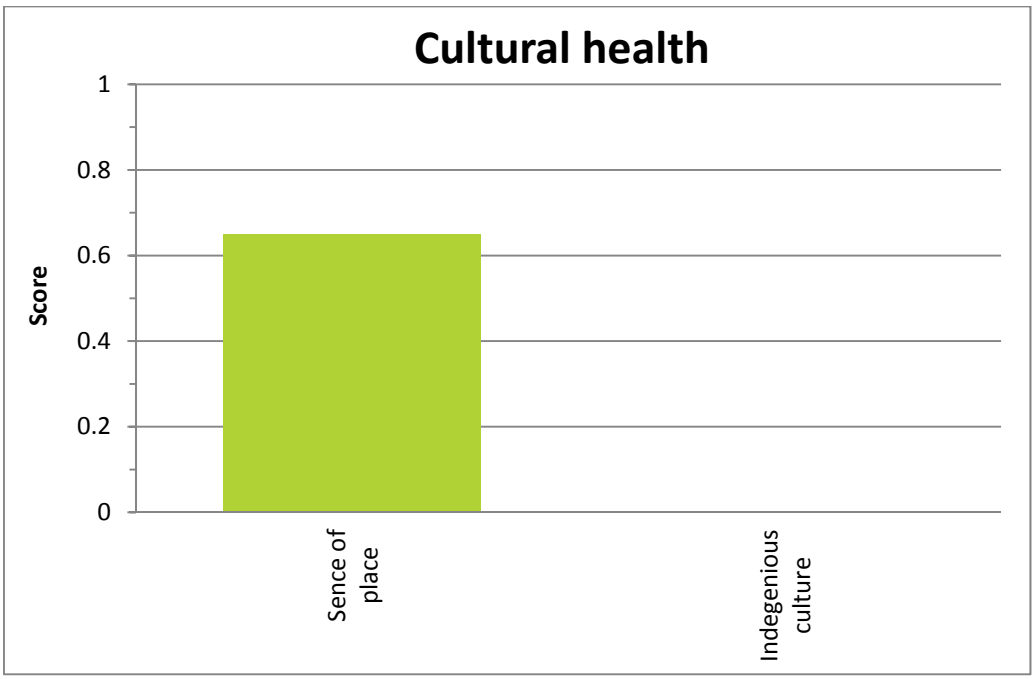


Figure 17: Cultural scores for the 2015 Gladstone Healthy Harbour report card: sense of place and Indigenous culture (not measured in 2015).

3.5.1 Sense of place

The overall grade for the cultural component of the 2015 Gladstone Harbour report card was a B. This grade was determined based on the sense of place related indicators. The 'sense of place' indicator was assessed through the community survey in September 2015. The cultural indicators are based on place and identity process as first described by Twigger-Ross and Uzzell (1996).

Distinctiveness is the degree to which the harbour provides an identity that is unique or distinct from other identities (the Distinctiveness of a place, viz., coastal view, industry landmarks), the qualities which distinguish it from any other place (iconic marine species viz., dolphins, dugongs), structure (the mental representation, spatially outlined) and meaning (subjective feelings linked to physically separate places).

Continuity is a temporal (time) aspect – the extent to which there has been continuity of self (include past selves/ancestors) and actions (aligns with 'rootedness' or 'insideness'). Continuity is also in relation to the way the harbour resources have been used (by past and present generations of a family as a recreational space). Also continuity of self can be used to pertain to Indigenous Australians who have ancestral links to places.

Self-esteem reflects the values and norms and individual holds in that it garners pride in one's identity and place (it does not degrade the pride an individual has (value & importance) of the place (Gladstone) and thereby their association themselves and provides positive feedback).

Self-efficacy relates to the extent to which a place facilitates/enables one's chosen lifestyle (does not hinder one's social and economic opportunities). There is a sense of 'feeling at home' & allows spiritual fulfilment or has restorative capacity by enabling individuals to get away from everyday routines.

Table 12: Grades and scores for the cultural sense of place component of the 2015 Gladstone Harbour report card.

Indicator Groups		Score/ Grade	Cultural Indicators	Score
Cultural (C)	Sense of Place	0.65 B	Distinctiveness	0.55
			Continuity	0.57
			Self-esteem	0.72
			Self-efficacy	0.56
			Attitudes to harbour	0.80
			Values of harbour	0.64
	Indigenous cultural	NA	Coming in 2016	

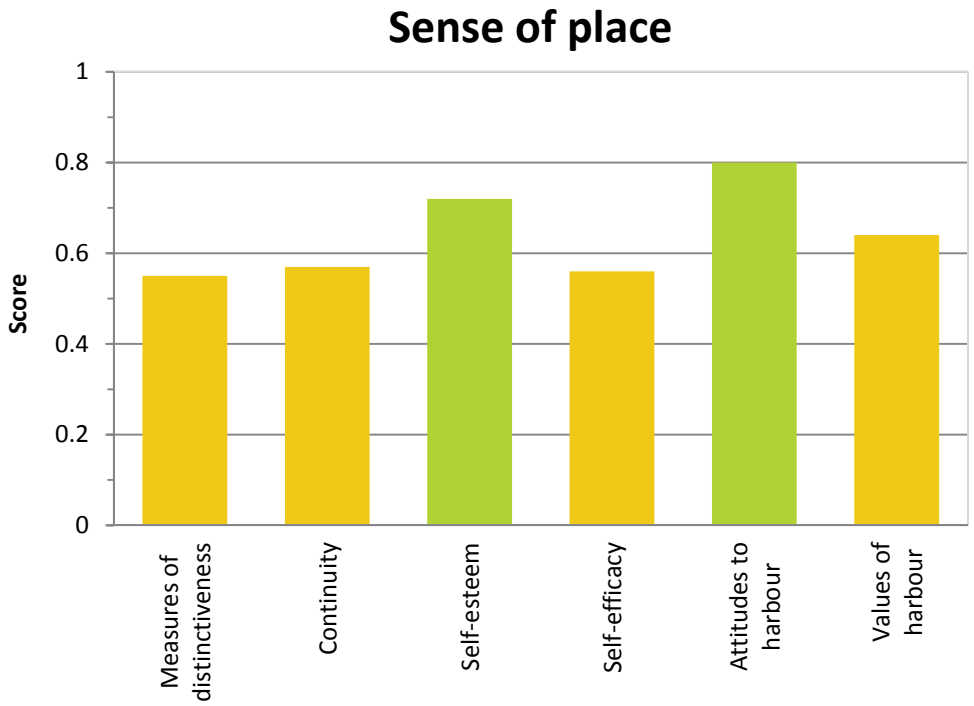


Figure 18: Scores for sense of place measures for the 2015 Gladstone Healthy Harbour report card

The only cultural indicator reported in 2015 is 'sense of place' which achieved a score of 0.65 making the overall grade a B. The highest value was recorded for attitudes to harbour (0.80) measure while the lowest was recorded for measures of distinctiveness (0.55). Other measures of continuity (0.57) and self-efficacy (0.56) received similar scores to the 2014 report card. However the measures of self-esteem (0.72) and values of harbour (0.64) received slightly increased scores as compared to the previous year.

All six measures fall in or above the acceptable indicator grade and suggest the community's expectations of the Gladstone harbour area are being met. However, some place-related identity measures (distinctiveness, continuity, self-efficacy) were less satisfactory than others.

The lower 'distinctiveness' measure suggests at first glance that perhaps people possess only a moderate identity with the harbour. Similarly, people's continuity with the harbour area is only moderate and points to many people not having an enduring attachment to the place. It is more likely that some discontinuity exists possibly due to changed demographics in the region following recent periods of development and change around the harbour area. An increase in the proportion of short-term or 'new' residents may be contributing to these scores. The self-efficacy score further supports this explanation as the harbour is not seen by most to be a place that offers opportunities and supports their chosen lifestyle.

Terra Rosa Consulting (Terra Rosa) have been appointed by GHHP to develop and pilot indicators and reference condition values aimed to inform the cultural heritage score of the indigenous cultural component within the GHHP Report Card. Their team are collaboratively with Gidarjil Development Corporation (Gidarjil) in developing an Indigenous Cultural Heritage Database (ICHD). Indicators to assess the number of registered cultural heritage sites protected along the Gladstone waterways and harbour.

3.6 Economic component results

The economic indicators address the following GHHP 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
- The Gladstone harbour enhances values of recreational and environmental assets (Pascoe et al. 2014a)

The component grade remained unchanged compared 2013-2014 reporting year (0.82).

The overall grade for the economic health component of the 2015 Gladstone Harbour report card was a **B (score of 0.77).** The overall grade was calculated from the aggregated scores of three indicator groups: economic performance, economic stimulus, and economic value.

Table 13: Grades and scores for the economic health component of the 2015 Gladstone Harbour report card.

Economic Indicators		Score/ Grade	Economic sub-indicators	Score
Economic health (B)	Economic performance	0.79 B	Tourism	0.64
			Commercial fishing	0.63
			Shipping activity	0.82
	Economic stimulus	0.82 B	Employment	0.64
			Socio-economic status	0.95
	Recreational value	0.72 B	Land-based recreation	0.73
			Beach recreation	0.70
			Recreational fishing	0.71

3.6.1 Economic Performance

The overall score for the economic performance indicator group was **0.79** (a decrease from 0.83 in 2014). Out of the three indicators assessed for economic performance, commercial fishing score (0.63) slightly reduced from 2014 (0.66) mainly due to a reduction in the trawl sector; and reduced shipping activity (0.82 slightly less than 0.83 in 2014), while tourism related sectors score was 0.64, up from the previous year. The total visitor numbers were largely the same as in the previous year, the ten year average (the benchmark against which tourism is assessed) decreased.

The three economic performance indicators were tourism expenditure, commercial fishing, and shipping activity.

Tourism

The total expenditure on tourism (expenditure on accommodation, food and other local services) in the Gladstone region was $266.7 million in 2014-15.

Tourism expenditure in the Gladstone LGA decreased markedly from 2005-06 to 2009-10, but has been relatively constant since then. Based on visitor numbers to the Gladstone visitor centre, total tourism was unchanged between 2013 and 2014. A new estimate of total value of tourism was obtained that includes expenditure on accommodation, food and other local expenditure. In contrast, the previous estimate of value was based just on accommodation expenditure. As a consequence, the value of tourism was increased from $77m to $266.7m. This increase results in tourism having a greater weighting in the overall economic performance category (with the Conditional probability tables re-estimated given the values for each of the components). The tourism score is based on the expenditure relative to the 10 year average.

Commercial Fishing

The calculated Gross Value of Production (GVP) for Gladstone harbour fisheries in 2014-15 was $3.5 million, well below the 2013-14 value of $4.5m. The sector, however, remained relatively strong compared with neighbouring regions with similar fisheries. In general economic terms, the line and net sectors performed very poorly, with the line sector effectively no longer active in the region. Net fishing production in 2014-15 declined a little from the previous year, and remained at about half of the long-term average for this sector. The crab (pot) fishery production was reported to be at about the same high level as last year, although as explained in the 2014 report, these data are considered to be unreliable. Production in the trawl sector decreased by around 17% from the previous year. Combining the fishing effort and productivity data for the four sectors (weighted by their relative contribution to GVP) yielded a score of 0.63 for this indicator (0.66 in 2014).

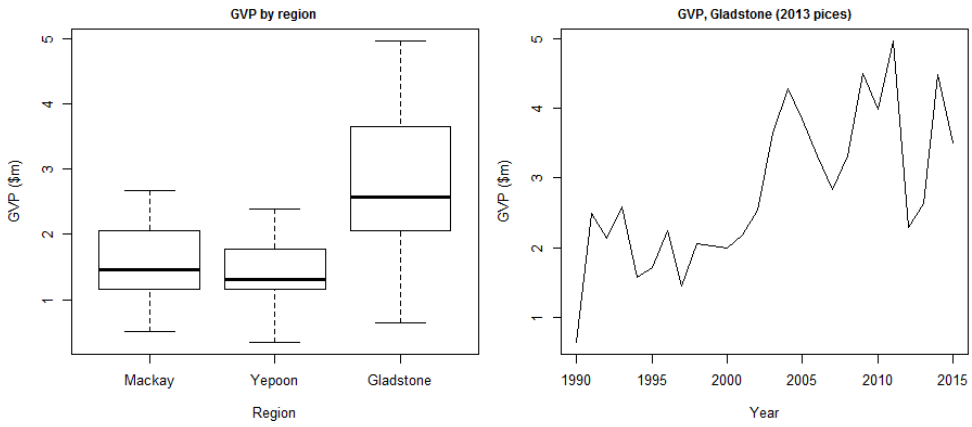


Figure 19: Gross Value of Production (GVP) of regional fisheries and Gladstone prices

In general productivity terms, the line and net sectors performed very poorly, with the line sector effectively no longer active in the region. Net fishing productivity in 2014-15 declined slightly from the previous year, and remained at about half of the long-term average for this sector. The crab (pot) fishery was at about the same high level as last year, although the trawl sector decreased by around 17% from the previous year. Combining the fishing effort and productivity data for the four sectors (weighted by their relative contribution to GVP) yielded a score of 0.63 (down from 0.66 in 2014).

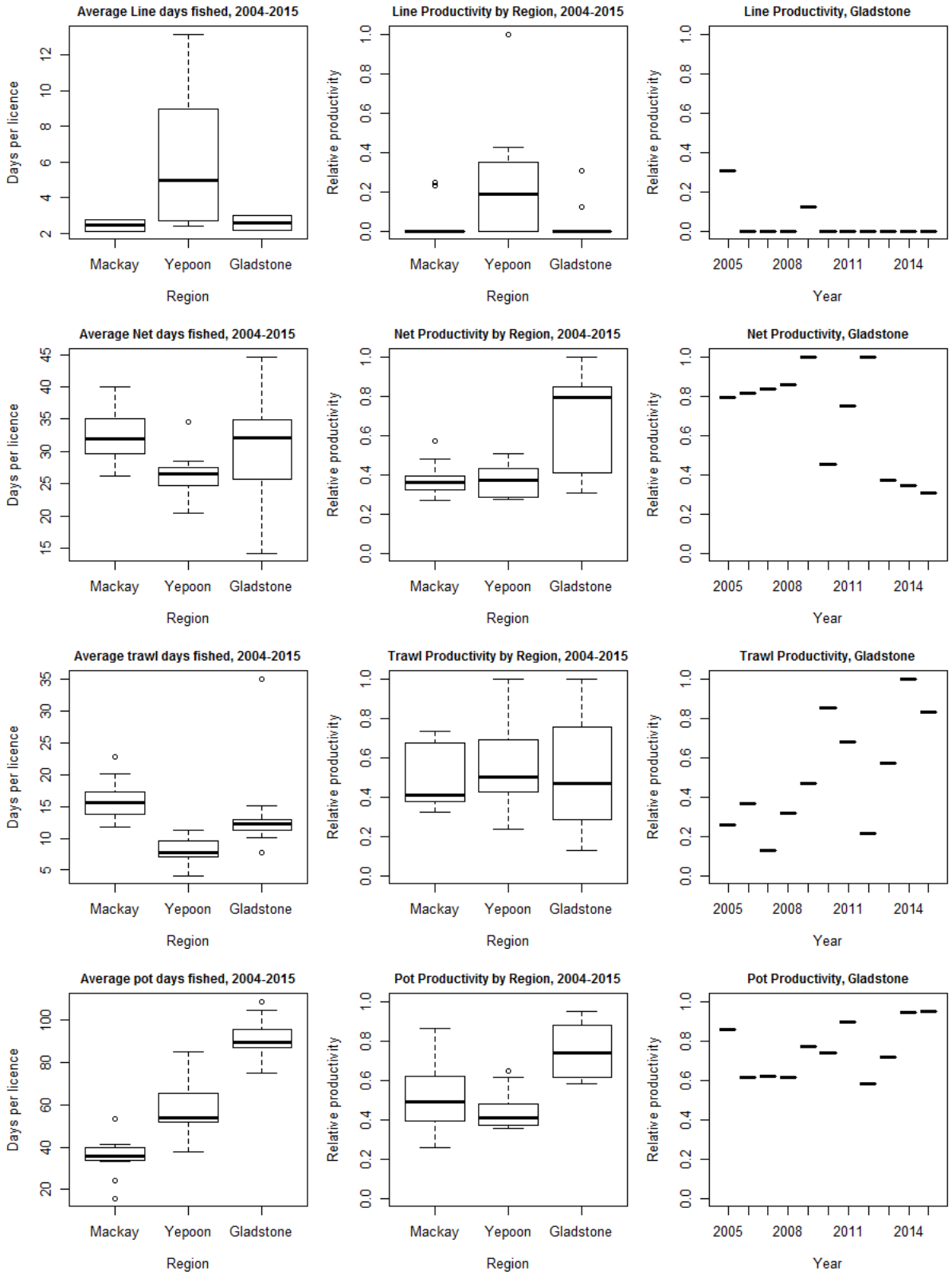


Figure 20: Relative productivity has varied considerably amongst the four fishery sectors in Gladstone harbour. The line fishery has declined to virtually zero, while the net fishery has not performed since peaks in 2010 and 2012. However, both the trawl and pot sectors remained relatively strong.

Shipping

In 2014-15 the Gladstone Ports Corporation generated $453m in total income, down from 2013-'14 of $691m, which was down again substantially from the previous year 2012-13 ($889m) as reported in the GPC annual general report (GPC, 2015: page 3, Table entitle 5-year performance). As in previous years, coal exports accounted for around two thirds of export shipping and bauxite imports for the aluminium industry provided around half of the import shipping. The total quantity of ship movement information provided by GPC for the study was a little lower in 2014-15 than in the previous year (pers. comm.), although capacity utilisation remained high relative to past years. When expectations of future shipping from the Curtis Island LNG plants and the expansion of Fisherman's Landing were factored in, the capacity utilisation score was reduced, yielding an overall score of 0.82 (0.83 in 2014).

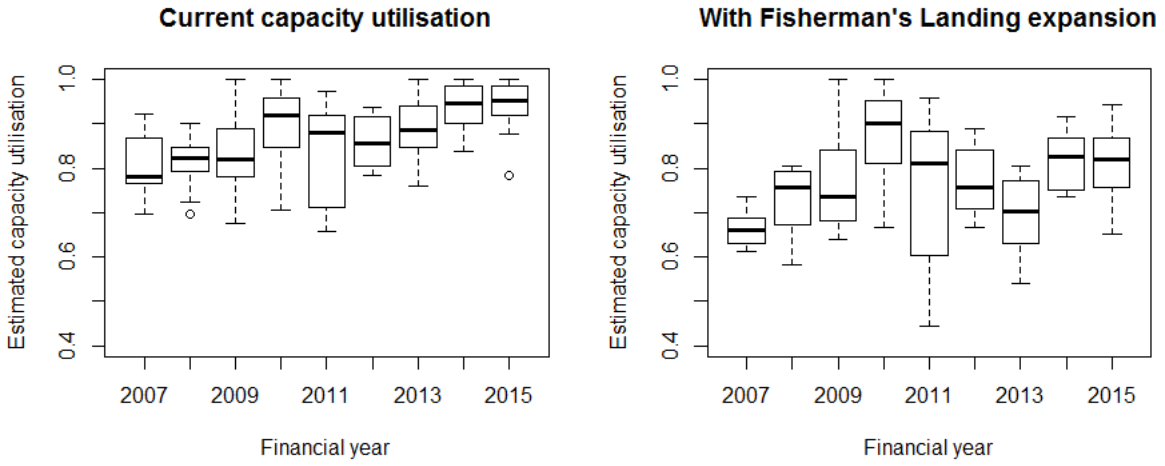


Figure 21: Data calculating relative current capacity utilisation with a) current facilities, and b) with Fisherman's Landing expansion

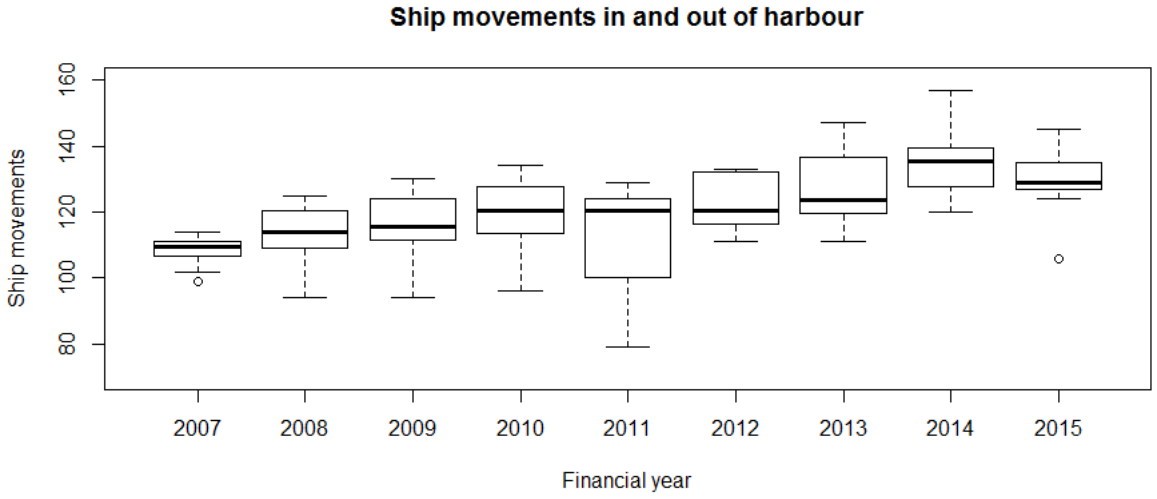


Figure 22: Gladstone harbour ship movements for years 2007-2015 (Courtesy: GPC, 2015)

For the economic performance indicators, the highest score was received by shipping activity (0.82) followed by tourism (0.64) and commercial fishing (0.63), refer to Figure 23.

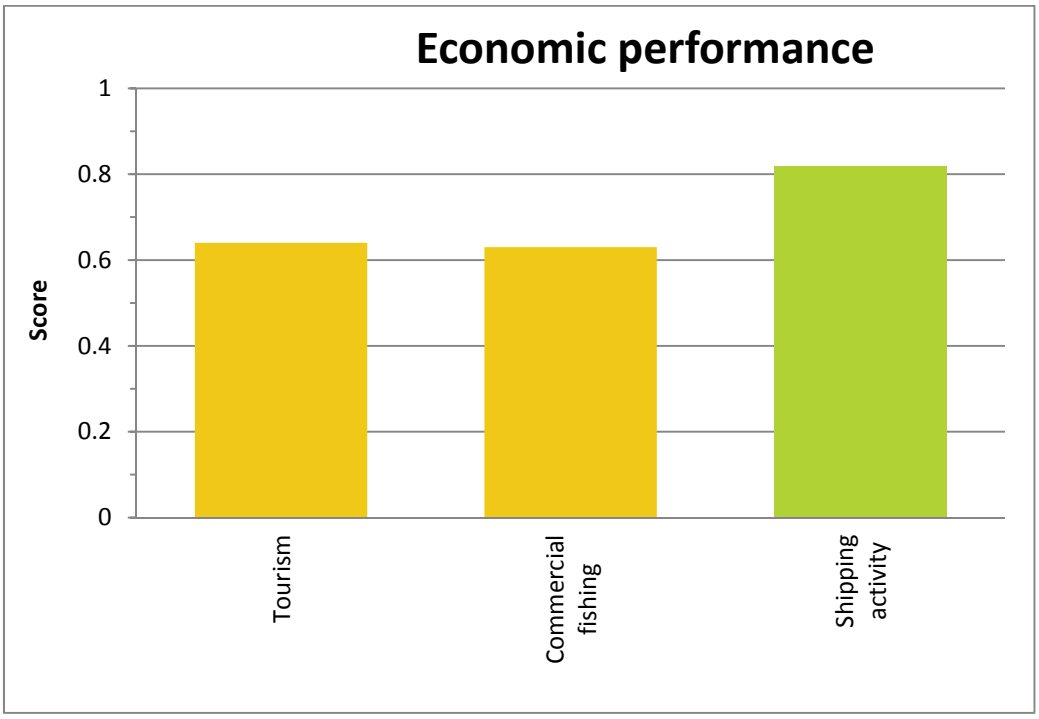


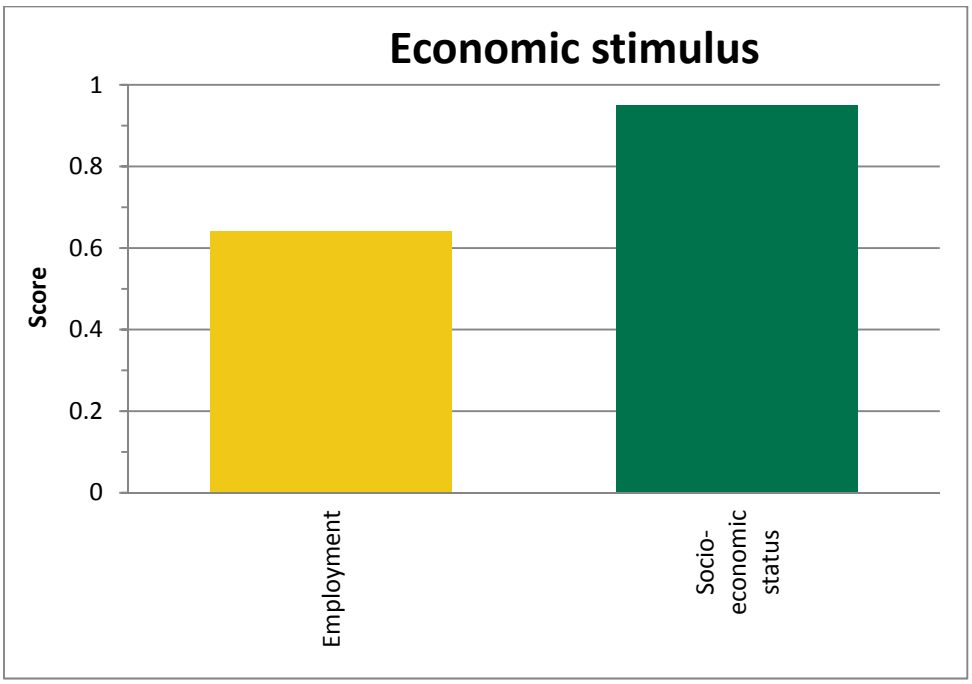
Figure 23: Scores for economic performance in the 2014-15 reporting year

3.6.2 Economic Stimulus

Of the three indicator groups, economic stimulus received the highest score of **0.82** (a slight decrease from 0.87 in 2014). This slight change was driven by a decrease in employment score while the score for socio-economic status of the Gladstone community remained very high.

The unemployment rate of 4.7% was within the best 40% within the State, giving a score of 0.64 for the employment indicator. Although unemployment fell from the 4.8% to 4.7% in 2014, many other regions experienced greater declines in unemployment, so the relative position of Gladstone deteriorated slightly compared to other Local Government Areas in Queensland.

The high score for socio-economic status was driven by the high proportion of residents who were in high income groups, the relatively high proportion of home ownership and the relatively large size of houses in the region.



24: Scores for economic stimulus in the 2014-15 reporting year

3.6.3 Economic Value

The indicator group economic value received a score of 0.72 (a slight decrease from 0.75 in 2014). Economic value was assessed in terms of non-market values of land based, beach recreation and recreational fishing.

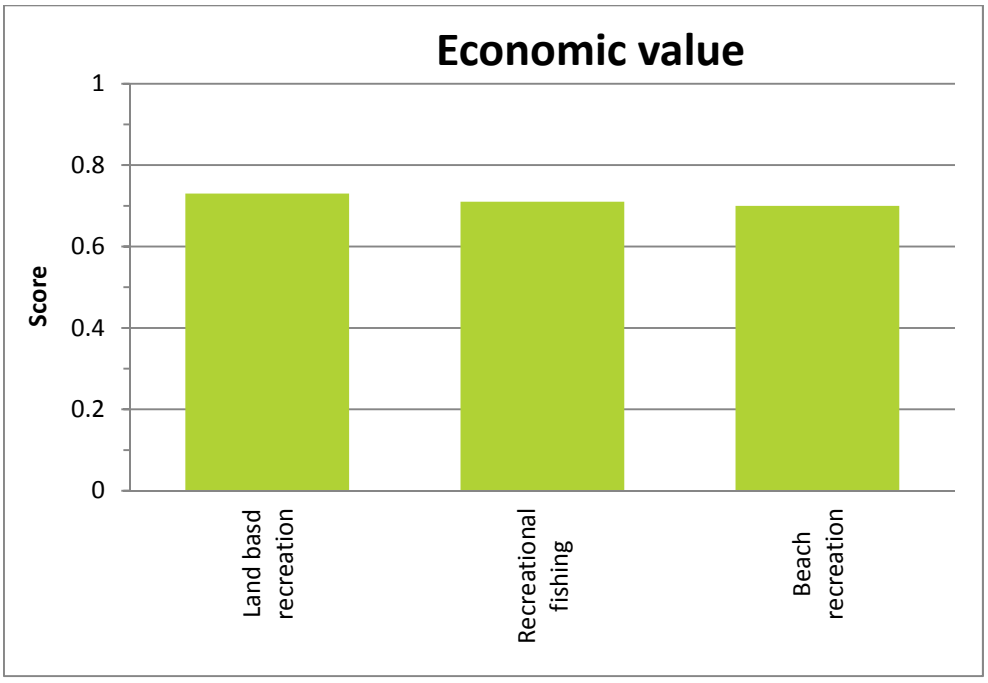


Figure 25: Scores for economic value in the 2014-15 reporting year.

All three indicators received similar scores with land-based recreation being the highest of 0.73 and beach recreation with lowest score of 0.70. The recreational fishing received a score of 0.71.

About 97% of respondents (based on 154 participants from the CATI survey) reached the harbour by car and a small percentage of (3%) walked. The most popular land-based activities among the respondents include walking followed by picnicking/barbecuing and relaxing by the water. The most popular beach visited by the survey participants was Tannum Sands followed by Spinnaker Park artificial beach and Boyne Island. Land-based and beach recreational activity was much more prevalent than recreational fishing. Over 95% of respondents had participated in land-based and beach recreation, but only 38% had been recreational fishing.

The mean value of a recreational fishing trip is estimated at $143.16 per trip, ranging from $73 to over $4000 per trip. On average each trip included 2.37 adults, with an average trip cost per adult of $60.40. The average annual value of recreation trips for the Gladstone population is estimated at $21.34 million. These values do not affect the economic scores but provide quantification of the economic values attributable to recreation in Gladstone harbour.

4 Discussion

4.1 Social indicator distributions and trends

The entire complexity of the Bayesian Belief model and the distributions of CATI responses for the social indicator groups are presented in Figure 26.

In terms of harbour usability, the majority of the community view the harbour area as a place providing recreational facilities and an environment to undertake leisure activities. The harbour area is seen as a producer of healthy food for consumption and a safe place to enjoy day and night. Concerns continue to exist around pollutants (air and water) and marine debris and litter but these do not appear to impede the community's usability of the harbour area and its resources. Air and water quality concerns may be an artefact of past issues and the proximity of industry in and around the Gladstone Harbour area.

The harbour area remains a key area for residents to visit and recreation levels remain similar to 2014 levels. The harbour access indicator score reflects a view residents' recreation experience is not limited by public space access or the quality of boating facilities. However, shipping activity in the harbour continues to be seen as a factor impacting on people's harbour access. The harbour environment is viewed positively by many residents and they hold strong beliefs of this continuing into the future. In terms of the community contributing to public management decisions about the harbour, not all residents feel such an opportunity is available to them.

Generally, people living in the Gladstone region find Gladstone harbour provides them with a positive living experience and quality of life. Many residents participate in community events that are held in the harbour area, and their involvement supports the physical and mental health of the community.

4.2 Cultural indicator distributions and trends

The entire complexity of the Bayesian Belief model and the distributions of CATI responses and secondary economic data sources are presented in Figure 27.

The sense of place indicator reveals harbour is viewed as a place of pride and this is reflected in the higher self-esteem measure. Nevertheless, attitudes and values of the harbour show people have a positive outlook about the harbour area and what it provides to the community.

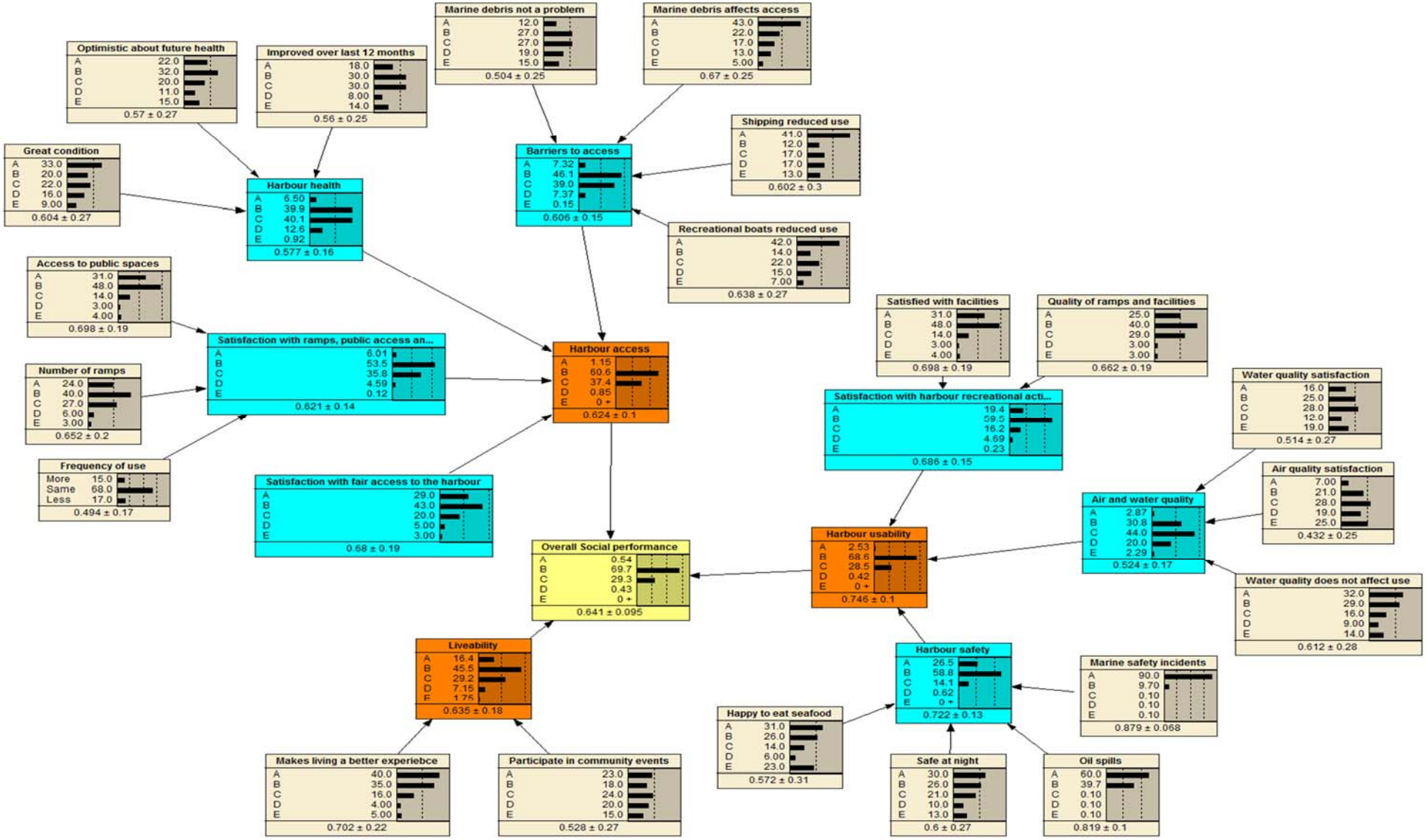


Figure 26: Bayesian Belief Model results for Social indicator group, including distributions for the GHHP 2015 report card

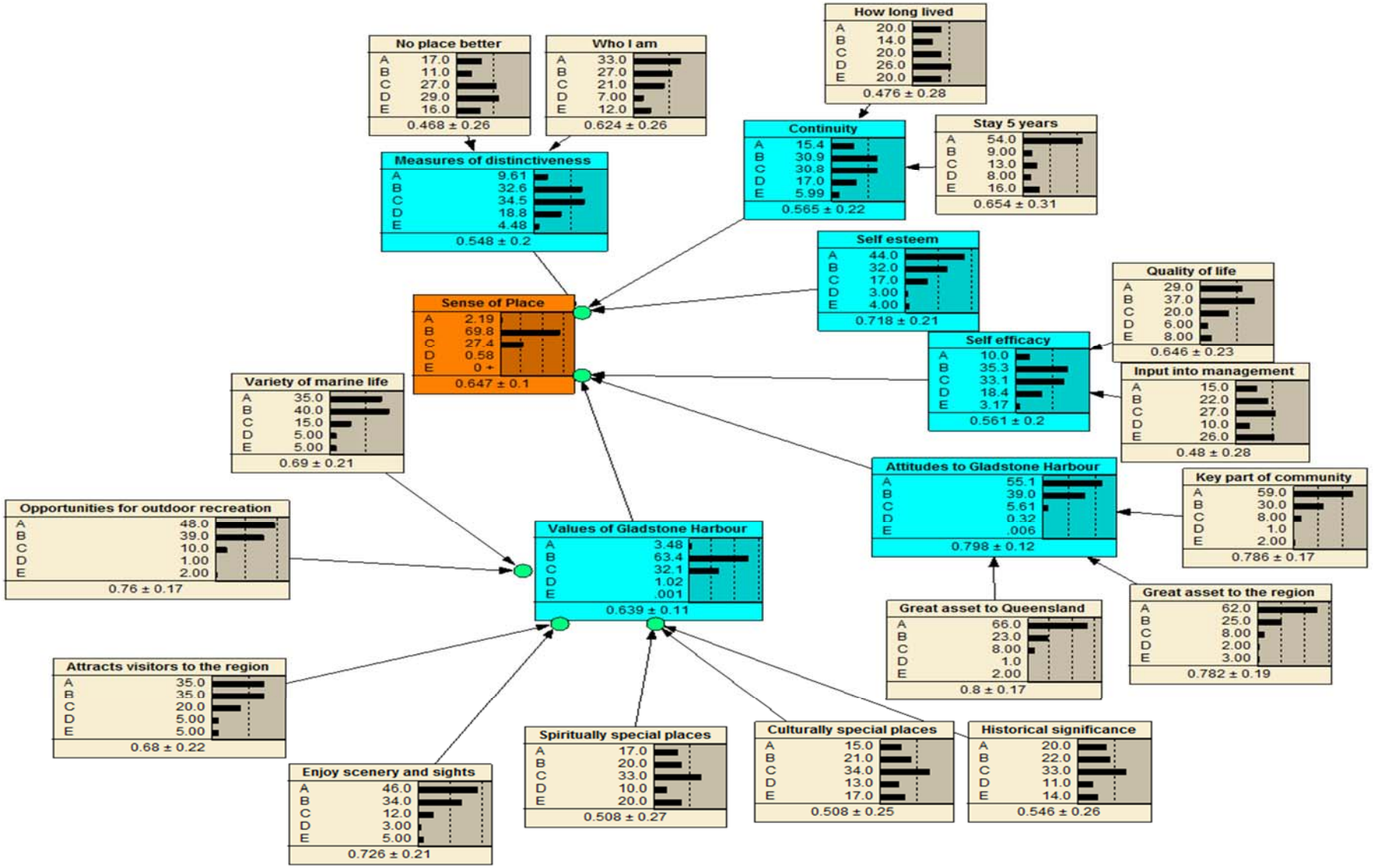


Figure 27: Bayesian Belief Model results for Cultural (non-indigenous) indicator, sense of place, including distributions for the GHHP 2015 report card

4.3 Economic indicator distributions and trends

The entire complexity of the Bayesian Belief model and the distributions of CATI responses and secondary economic data sources are presented in Figure 28.

As previously explained the economic performance measure assesses the performance of the three key industries that are based on Gladstone harbour: tourism commercial fishing, and shipping, that underpins the stimulus into the Gladstone regional economy. Shipping activity provides a proxy for economic activity in key exports such as coal, as well as the imports and exports associated with harbour-based industries such as mineral processing. The high score for shipping activity confirms that these export-focused industries are generating a major economic stimulus into the local economy. Tourism is an important sector for the harbour-based city. Fishing is an important sector for the harbour-based city, although activity is lower than in the previous year.

Economic stimulus looks to assess the economic activities that may flow benefits through to the community. In 2015, the low unemployment rate indicates that the economic stimulus from harbour-based industries is having a positive effect on the local economy and creating jobs. The high score for socio-economic status indicates that the economic stimulus from harbour-based industries was flowing through the local economy to create greater income and wealth, and to provide better access to economic resources such as housing.

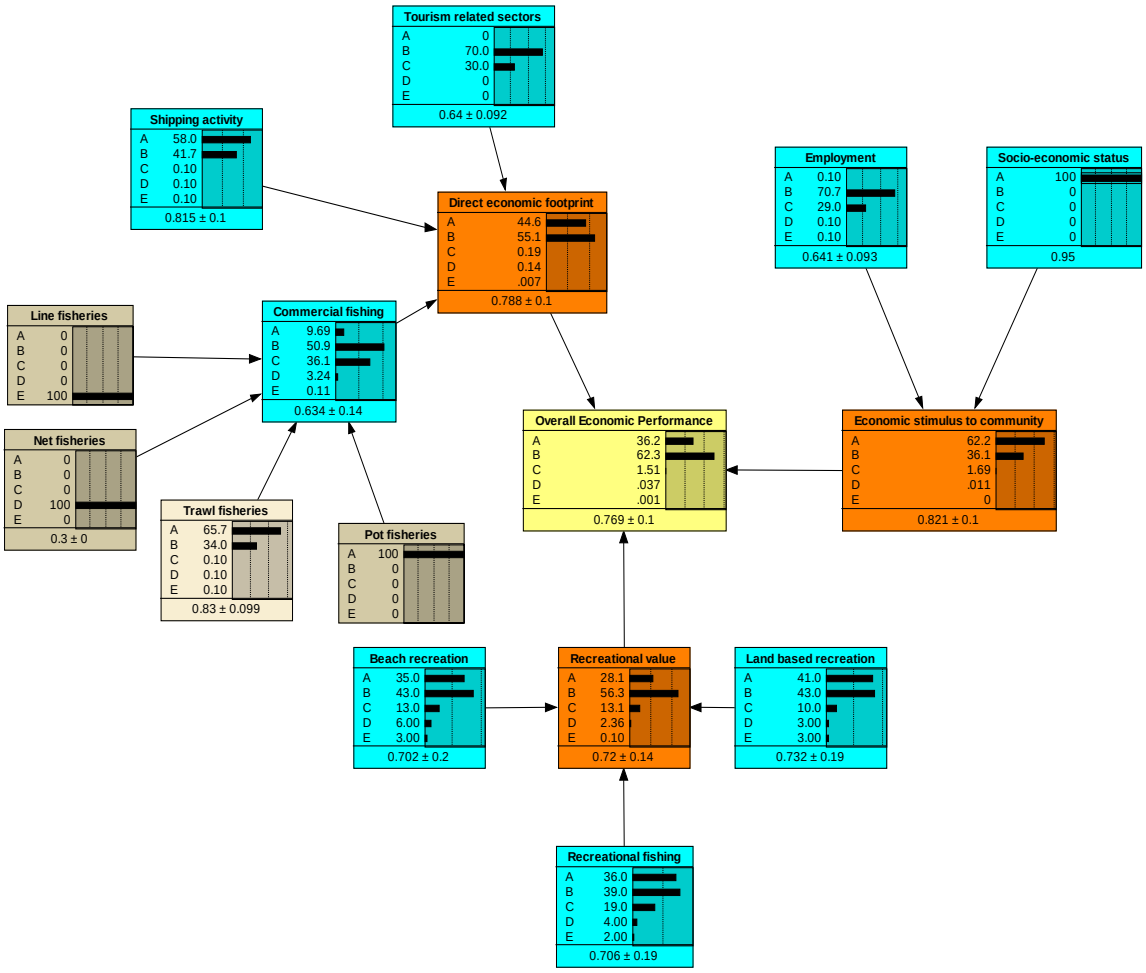


Figure 28: Bayesian Belief Model results for economic indicator group, including distributions for the GHHP 2015 report card

4.4 Derivation of economic value due to recreational

As with the previous year, the measures of economic value (recreational) were a combination of the average economic value per different type of trip (which was used to weight the contributions of each component), and the level of satisfaction experienced by those who undertook the activity. The study this year focused on estimating a value for recreational fishing, which was under-represented in last year's survey.

In terms of satisfaction, beach recreation was similar in both years. Land based recreation satisfaction declined from 0.76 to 0.73, while recreational fishing satisfaction increased from 0.67 to 0.71 on average. As a result of these changes, and the adjusted weights based on the better estimates of recreational fishing benefits, the score for recreational value declined from 0.75 to 0.72.

This measure assesses how the community generates economic values from the harbour through recreation activities. Economic activity in Gladstone generates income and wealth to the local community; the importance of the harbour is then assessed by how much of that wealth is spent back on recreational activities in the harbour.

1. Land based recreation was the most important activity with the average annual value for the Gladstone population estimated at $45.43 million.
2. Beach recreation was estimated to have an annual value of at $27.98 million.
3. Recreational fishing had a higher per trip value compared to beach and land based recreation activity but with a lower frequency across the population. The annual value was estimated at $21.34 million.

5 Conclusions

The development of the GHHP report card in 2015 marks an important milestone for the community, stakeholders and managers of the Gladstone harbour region. The research conducted under this project has achieved the collection of the social, cultural (sense of place only) and the economic data for 2014-2015 Gladstone Healthy Harbour monitoring year. The data was sourced preferentially from long-standing organisations or data sources.

We have reported on the report card grades and scores for social, cultural and economic indicators and provided detailed explanation of the slight modifications made to those statistical methods developed during the pilot year. This report has provided a further interpretation of the resulting trends and Bayesian belief network distributions as compared to the GHHP 2014 pilot report card grades and scores of the previous year. This marks the first known report card to cover the social, cultural and economic health of a harbour.

Appendix A Survey Questionnaire

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 CSIRO and Central Queensland University and James Cook University. 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?

1) Do you live in the Gladstone region? Yes/No (screening question)
Possible age and gender screening questions here? -

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

3) How long have you lived in the Gladstone region? _____ (years) _____ (months)

4) 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.

5) 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 all water-based activity, and the third to shore-based activity.

6) a) In the previous 12 months, did you visit the Gladstone Harbour area at all? _____ Yes/No

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

7) 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

7a) 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)

8) 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	

9) 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)	

10) 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	

11) 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
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12) 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)	

13) In the last year, how often have you done **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	

14) 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
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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 trips where you paid a commercial operator. We are also only interested in trips where you spent 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.

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

a. 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	

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

Walk	
Bicycle	
Motor vehicle	
Other	

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

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

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

No of adults (including yourself)	
No of children (16 yrs and under)	

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

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

Spent most of the time doing this activity	Yes/No
If you did other things as well, approximately what proportion of your time was spent doing the recreational activity *Do not include travel time*	% of time

22) Did your activity involve the use of a boat _____ Yes/ No
If yes

23) Approximately how many kms or nautical miles did you travel by boat? _____ kms or _____ nautical miles

24) Roughly how many Litres or $ worth of fuel did you use? _____L or $ _____

25) Thinking of this recreational 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
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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

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

	Strongly Disagree				Very slightly	Very slightly				Strongly Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
26) I am satisfied with the level of access to public spaces around Gladstone Harbour											
27) I am satisfied with the number of boat ramps available in the Gladstone Harbour area											
28) I am satisfied with the quality of boat ramps available in the Gladstone Harbour area											

	Strongly Disagree				Very slightly	Very slightly				Strongly Agree	**No Answer**
28a) I am satisfied with facilities associated with boat ramps in the Gladstone Harbour area											
29) I have fair access to Gladstone Harbour compared to other users of the harbour											
30) There are other places that are better than the Gladstone Harbour area for the recreational activities that I do											
31) The amount of commercial shipping in Gladstone Harbour has reduced my use of the area											
32) The amount of recreational boating activity 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 Disagree				Very slightly	Very slightly				Strongly Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
33) The Gladstone Harbour area is not in great condition											
34) I feel optimistic about the future health of Gladstone Harbour											
35) The health of the harbour has improved in the past 12 months											
36) Marine debris and litter is not a problem in Gladstone Harbour											
37) The amount of marine debris and litter in Gladstone Harbour affects my access to the area											
38) *											

**Note question 38 left blank to minimise reprogramming of the survey.*

With 1=strongly disagree to 10=strongly agree	Strongly Disagree				Very slightly unsatisfied	Very slightly satisfied				Strongly Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
39) I think water quality in Gladstone Harbour is in good condition											
40) I think air quality in Gladstone Harbour is in good condition											
41) The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months											
42) I would be happy to eat seafood caught in the Gladstone Harbour area											
43) I feel safe being in the Gladstone Harbour area at night											
44) Gladstone Harbour makes living in Gladstone a better experience											
45) 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 Disagree				Very slightly unsatisfied	Very slightly satisfied				Strongly Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
46) I feel able to have input into the management of the Gladstone Harbour if I choose to											
47) I believe the traditional sites and customs in the Gladstone Harbour area are well protected											
48) 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 Disagree				Very slightly unsatisfied	Very slightly satisfied				Strongly Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
49) I feel proud that I live in the Gladstone community											
50) The Gladstone Harbour area is part of who I am											
51) The Gladstone Harbour area improves my quality of life											
52) I do not plan to be a resident of this region in the next 5 years											
53) 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 slightly	Very slightly				Agree	**No Answer**
	1	2	3	4	5	6	7	8	9	10	
54) I value the Gladstone Harbour area because it supports a variety of marine life											
55) I value the Gladstone Harbour area because it provides opportunities for outdoor recreation											
56) I value the Gladstone Harbour area because it attracts visitors to the region											
57) The Gladstone Harbour area is a great asset for the economy of this region											
58) The Gladstone Harbour area is a great asset for the economy of Queensland											

59) I value the Gladstone Harbour area because I enjoy the scenery and sights											
60) I value the Gladstone Harbour area because there are spiritually special places											
61) I value the Gladstone Harbour area because there are culturally special places											
62) 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.

63) What is your age?

18-24	25-34	35-44	45-54	55-64	65+
☐	☐	☐	☐	☐	☐

64) Are you male ☐ or female? ☐

65) Do you identify as a traditional owner of the area? Yes ☐ No ☐

66) 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**
	☐	☐	☐	☐	☐	☐	☐	☐

67) How many adults (> 18 years old) live in your household? ☐

68) How many children 15 years and older old live in your household? ☐

69) How many children younger than 15 years old live in your household? ☐

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

71) Is any adult in the household self employed? Yes ☐ No ☐

72) Is your home:

Owned with a mortgage?	Owned without a mortgage?	Rented?
☐	☐	☐

a. I*f owned with a mortgage*, is your mortgage repayment greater than $3000/month
Yes ☐ No ☐

b. *If rented*, is your rent payment greater than $175/week
Yes ☐ No ☐

73) Does your household have a car? Yes ☐ No ☐

74) How many bedrooms does your house have? ☐

Final questions: and then thank them for their participation

74a.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 Sean Pascoe from the CSIRO, who can forward further details to you. Would you like these? (if yes then provide email sean.pascoe@csiro.au)

Thank you for your participation

Appendix B Data compilation and analysis protocols

B.1 Data files used in the analysis

A number of data files are used by the R program to derive the scores. A summary of these are given below and details on what needs to be done to update these files are given in the following sections.

File name	Brief description	Used for
Files that change annually		
ABARE_fish_prices.csv	Average fish prices	Economic performance
CATI2015.csv	CATI survey data (2015)	All
incidents.csv	Marine oil spills and incidents	Social
newfishdata.csv	Catch and effort information by region and year	Economic performance
shipping2015.csv	Shipping information	Economic performance
TourismSpend.csv	Time series of tourism expenditure in Gladstone	Economic performance
unemployment.csv	Regional unemployment figures, latest available	Economic performance
Files that change every 5 years		
IER2011.csv	Index of economic resources, 2011, Qld	Economic performance
recBenfitParameters.csv	Travel cost analysis results	Economic performance
SIdata.csv	Social scientist survey weighting information	Social and Sense of place
objectivedata.csv	Community objective weightings	All

B.2 Files that change annually

B.2.1 ABARE_fish_prices.csv

Average prices for each fish species derived from ABARES fisheries statistics are used and included in the file "ABARE_fish_prices.csv". These are the average price for prawns, crab and fish derived from the Queensland production table in the ABARES fisheries statistics. The current table is S9, although table numbers change from year to year so an exact table number is not useful. A common average price is used for all catch based on the dominant species caught.

The current price data in the file relates to the 2012-13 financial year. Updated values are available from the ABARES publications page in the Australian Fisheries and Aquaculture Statistics series http://www.agriculture.gov.au/abares/pages/publications/default.aspx. The relevant tables are available as part of a downloadable excel file.

B.2.2 CATI2015.csv

CATI data collection is undertaken by a third party survey company. The final data are delivered in both csv (comma separated variables) and xls (Excel) files. Data quality assurance and quality control checks are an important first step to ensure transcription errors are not in the data. For example, most scores are on a 10 point scale, so a value of 11 would be an error. Some interviewers enter a "99" for no answer, while others have left it blank. The R code is designed to only accept values between 1 and 10, so values outside this range should be examined, modified (if believed appropriate) or deleted. It is recommended that several analysts perform this step.

The necessary analyses of the CATI data are undertaken in R as part of the development of the score card results. The analysis assumes that the same information is available each year (i.e. the same questions are asked). The final data should be saved as a csv file named "CATI2015.csv" (for example for 2015 data). The column headings should just be the question numbers as indicated in the original survey e.g. Q1, Q2, Q3Y, etc. They do not need to be in the same order, but need to match the original question.

If the file name is also changed to reflect the new data (e.g. CATI2016.csv), then the read statement in the all R scripts that call the CATI data will also need to be correspondingly modified

B.2.3 Incidents.csv

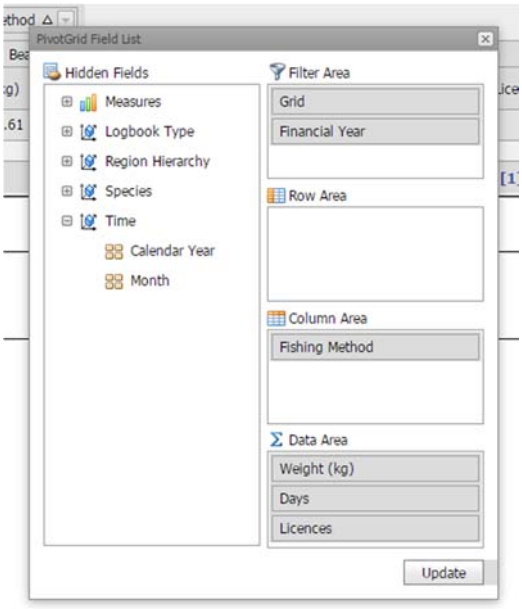
This contains data on oils spills and marine safety incidents in Gladstone Harbour as well as other key Queensland harbours.

1. Download the data on Oil spills and Marine Pollution events reported to Marine Safety Queensland, available through the Queensland Government Data portal.
2. Marine incidents data are found http://www.msq.qld.gov.au/About-us/Marine-incident-annual-reports. The data used for 2015 was taken from Table 2 of the 2014 report. The layout of each report may change from year to year, but what is required is the number of incidents by port and the number of vessels.
3. Oils spill information is found at https://data.qld.gov.au/dataset/marine-oil-spills-data. As with marine incidents data, the updated values need to be extracted.
4. The values for the next year are extracted from the reports and entered into the datasheet entitled "Incidents.csv" e.g. for 2016 the data will be entered into column B in the case of Marine safety incidents and column D for Oil Spills. The number of recreational vessels and number of commercial vessels is entered into column E and F respectively. The calculations for incident rate is done in column G entitled 'Irate' and calculations for the oil spills rate is done in column H.

B.2.4 newfishdata.csv

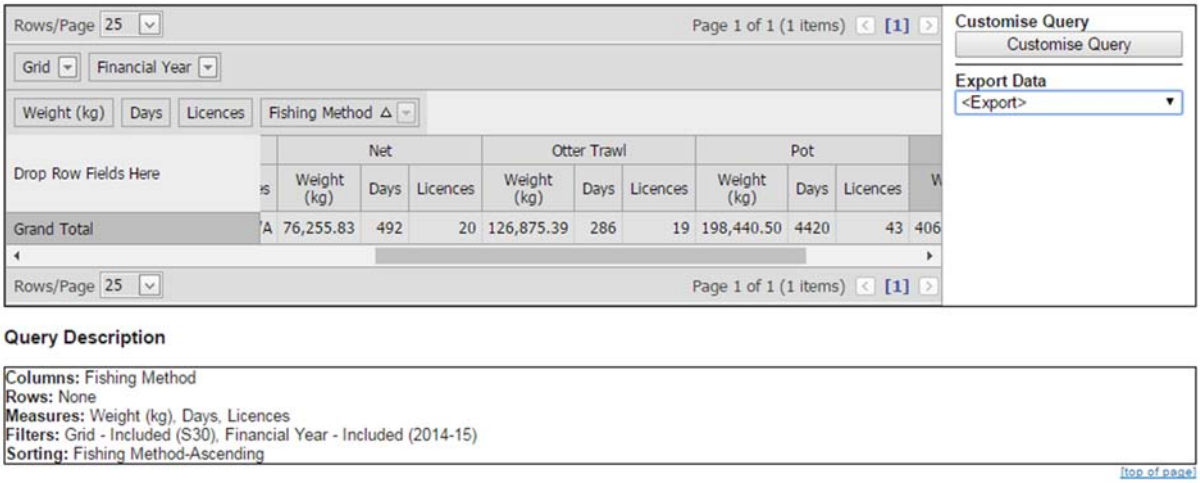
This contains commercial fishing data for use in the economics performance component.

1. Productivity of line, net, trawl and pot fisheries is estimated as total value of fish and crustaceans harvested from QFish zone S30 in four fishery sectors, trawl, pot, line & net.
2. The data are downloaded from the QFISH website (http://qfish.fisheries.qld.gov.au/) using a series of custom download queries.



- Grid and Financial year are selected as filters
  - Cells = S30, R29, 025 (have to be selected one at a time)
  - Financial year = year of interest
- Fishing method is selected as the column
- Weight, Days and Licences are selected as the data areas

The resultant output (see below) can be exported to an Excel sheet



Query Description

Columns: Fishing Method
Rows: None
Measures: Weight (kg), Days, Licences
Filters: Grid - Included (S30), Financial Year - Included (2014-15)
Sorting: Fishing Method-Ascending

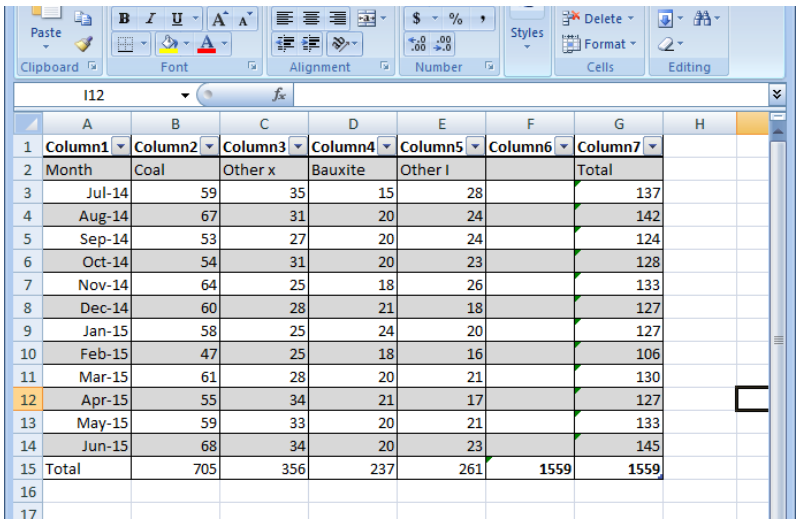
[top of page]

3. These new data should be added into the csv file "newfishdata.csv", following the same format is in the current version of the file.

B.2.5 shipping2015.csv

Shipping activity data is provided on request by Gladstone Ports Corporation (GPC) data. The process is as follows:

1. Request vessel count data by email to Gladstone Ports Corporation (GPC) data requesting total coal and other exports and bauxite and other imports. Note: data release is subject to GPC Chief Financial Officer approval. The shipping activity productivity calculated from Monthly shipping movements by cargo type.



	A	B	C	D	E	F	G	H
1	Column1	Column2	Column3	Column4	Column5	Column6	Column7	
2	Month	Coal	Other x	Bauxite	Other I		Total	
3	Jul-14	59	35	15	28		137	
4	Aug-14	67	31	20	24		142	
5	Sep-14	53	27	20	24		124	
6	Oct-14	54	31	20	23		128	
7	Nov-14	64	25	18	26		133	
8	Dec-14	60	28	21	18		127	
9	Jan-15	58	25	24	20		127	
10	Feb-15	47	25	18	16		106	
11	Mar-15	61	28	20	21		130	
12	Apr-15	55	34	21	17		127	
13	May-15	59	33	20	21		133	
14	Jun-15	68	34	20	23		145	
15	Total	705	356	237	261	1559	1559	
16								
17								

2. Prepare data sheet for entry of current year data by adding extra rows as needed to the file entitled "shipping2015.csv". Advance the yearcount so that 2016 data becomes year count 0 while 2015 data (currently the most recent) year becomes count 1, and 2014 becomes year count 2, and so on through the whole data sheet (example data sheet).
3. Enter the shipping data provided by GPC as follows (example pictured above):
    a. Coal – number of coal shipping containers exported
    b. OtherX – number of other shipping containers exported
    c. Bauxite – number of bauxite shipping containers imported
    d. OtherI – number of other types of shipping containers imported
4. Save file again to "shipping2015.csv". The file can be renamed, but this will also require modifying the R code accordingly.

B.2.6 TourismSpend.csv

The measures is based on the most recent year's tourism expenditure as compared to the average over the previous 10-year period.

1. Retrieve the tourism value for the current year from http//www.economicprofile.com.au/Gladstone/tourism/output, and convert the tourism value so as to expressed in 2013/14 real values (based on the CPI figure available on the ABS website), then add the adjusted value to the bottom row of datasheet entitled "TourismSpend.csv". (Alternatively, the whole series can be adjusted to the most recent years values)
2. Save file name as it is.

B.2.7 unemployment.csv

1. These data are available through the Queensland Office of Economic and Statistical Research, available at: http://statistics.qgso.qld.gov.au/qld-regional-profiles.
2. A custom extraction is required:
    a. Select Local Government Area 2014 as the region type (Step 1)
    b. Select ALL regions (have to do this one at a time until all have been selected) in Step 2;
    c. Comparison region is the default "State (Queensland)"

d. Report type (Step 4) is Resident. Change “Included profile topics” to “Custom topic set”, click on “Clear checked topics” to clear the list, then click on “Unemployment and Labour Force” under Economy to re-check the box.

e. Set the output type to HTML (Step 5) as this is easier to copy from, then Create Report.

3. The output includes a table with unemployment by LGA. Copy and paste this into the unemployment.csv file (replacing the existing information).

B.3 Files that change every five years

B.3.1 Objective and measures weightings data

The data from the community weightings survey and also the survey of expert social scientists are used in the process of deriving the scores for the different components of the BBNs. These are contained in two files:

1. SIdata.csv
2. objectivedata.csv

Nothing needs to be done to these files, although the project recommends that the surveys are undertaken every 5 years (the original being in 2014).

B.3.2 recBenfitParameters.csv

This contains the results of the travel cost analysis, used to weight the different components of the recreational activity. A new travel cost analysis is suggested every 5 years.

Activity	Mean value of consumer surplus ($/trip)	Standard deviation consumer surplus	Number of people in sample (out of 400) who undertook the activity	Number of times a year they undertook the activity (i.e. trips)
Beach	40	7	379	29
Recreational Fishing	60	29	154	17.44
Land based	61	12	364	33

B.3.3 IER2011.csv

The index of economic resources for Queensland is available through the ABS: http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa. These data are downloadable as an excel spreadsheet. The current data are based on the 2011 census and are the most readily available. This file does not need to be updated until the results of the 2016 census are released (2018 or later). When new data are available, the relevant Queensland data need to be extracted and pasted into IER2011.csv (replacing the existing data). If the file name is also changed to reflect the new census data, then the read statement in the economic stimulus R script will also need to be correspondingly modified.

B.4 Running the R scripts

It is recommended that the files are run using RStudio (www.rstudio.com). This is a good R interface.

B.4.1 Key files

The files are broken up into several different components:

File name	What it does	Data inputs
General		
00_Software.R	This contains all the functions and main code common to all of the other components. It is called by each component as they run.	
Economic		
E1_Recreation.R	Recreational value	CATI2015.csv; recBenefitParameters.csv
E2_Stimulus.R	Economic stimulus to the community	CATI2015.csv; IER2011.csv; unemployment.csv
E3_Economic_performance.R	Direct economic footprint	ABARE_fish_price.csv; newfishdata.csv; shipping2015.csv; TourismSpend.csv
E4_Overall_economic	Combines the outputs from the above three to produce the overall economic performance scores	Csv files produced by each of the above three component files; objectivedata.csv
Social		
S1_Harbour_access.R	Harbour Access	CATI2015.csv; SIdata.csv
S2_Harbour_usability.R	Harbour usability	CATI2015.csv; SIdata.csv, Incidents.csv
S3_Harbour_liveability.R	Harbour liveability	CATI2015.csv; SIdata.csv
S4_Overall_social.R	Combines the outputs from the above three to produce the overall social performance scores	Csv files produced by each of the above three component files; objectivedata.csv
Cultural		
C1_Sense_of_Place.R	Sense of place	CATI2015.csv; SIdata.csv

B.4.2 Running the code

(i) Required libraries

The R scripts require several packages to be pre-installed before running, available through the install package option within RStudio. These are called by various parts of the code:

- Benchmarking
- randomForest
- dplyr
- tidyr
- knitr
- ggplot2

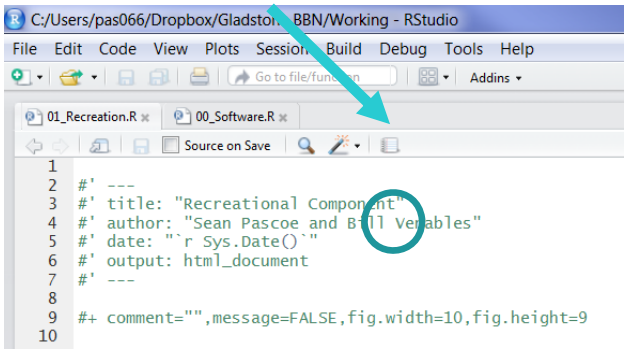
(ii) Opening the project

The files have been set up inside a project called “Working.RProj”.

1. Within R-studio, from the File menu, select “Open Project” and navigate to the working directory where the files are stored, and select “Working.RProj”.
2. Open the file to be run using the File menu.

(iii) R markdown

The code can be run most simply by using the R markdown feature in RStudio, which entails clicking on the Compile Notebook icon left of the run button.



This then gives the option of producing a HTML file, an PDF or a Word document. (It is currently set to HTNL, but can be changed to word by modifying the “#’ output:” command at the top of the file.)

Each component will produce a summary output file in the results sub-directory.

They will also produce the scores and standard deviations for each measure, indicator and objective, as well as a set of graphs.

The final set of economics and social results can also be obtained just by running the “Overall” codes. As only one cultural objective is included, the Sense of place file provides all the output for this objective.

B.5 Word cloud analysis

This protocol uses the data from a subset of CATI responses, these are the questions in the survey that relate to this analysis. Question 7A was introduced in the 2015 CATI survey. Many participants responded simply with ‘no-change’.

- ***Analysis of 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)*
- ***Analysis of Q7A:*** *7a) 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)

In preparation, the data from the following CATI responses are copied to the Word Cloud excel workbook:

- Q5A.1st word
- Q5B.2nd word
- Q5C.3rd word
- Q7A-A.First word
- Q7A-B.Second word (optional for inclusion)
- Q7A-C.Third word (optional for inclusion)

1. Convert all text in caps to upper and lower case

2. Calculate the number and percentage of 'none' responses. Highlight each response in yellow and then enter into Column D the number of None responses in cell D2, check the number of CATI responses are 400 and then the percentage of None responses will be shown in cell D4.
3. Before analysis to produce word cloud – all spaces are replaced with '-'. For example, a word response of Environmentally Friendly becomes Environmentally-Friendly.
4. Detect and correct all cases of mis-spelling. For example, Realaxing was edited to Relaxing, and Navagatable became Navigatable
5. Plural/singular consistency: make sure either the plural or singular of each word is used and not both. If both 'ferries' and 'ferry' are in the word responses then a decision needs to be made as to which word would look better in the word cloud. In 2015 for example, Boat became Boats, and Beach became Beaches.
6. Some prepositions or excess words were removed e.g. Good Ferry Rides became Good-Ferry; 'Life Blood Of The Town' became 'Lifeblood' and 'Love it' became 'Love'. Disappointed What's Happened became 'Disappointed', and The Harbour became just 'Harbour'.
7. Word tense checked for consistency. For example, the word response 'Polluted' (13 instances in the first word response, and 5 instances in the second and third word responses) was changed to Pollution.
8. Once steps 1-6 are complete the word sets should each be copied one at time and entered into the open source web-based app Wordle to produce the word cloud image, see www.wordle.net.
9. For each word set a word cloud image should be saved as a .png file. Note in 2015 two results, the first (Figure X) based on just the first word supplied by the respondent in answering the question. The second word cloud was produced from the word set which was a combination of all three words given by the respondents (first, second and third).
10. Identify all no-change responses, count and enter the tally in responses in cell H2, check the number of CATI responses are 400 and then the percentage of no-change responses will be shown in cell H4.
11. For the word responses other than no change, make sure steps 2-6 above.
12. Copy the word set and entered into the open source web-based app Wordle (go to www.wordle.net) to produce the word cloud image. This result will show the word cloud for all responses other than 'no-change'.
13. Save the word cloud image as a png file.
14. All resulting word set that were analysed using were then shown as a list of words in one of the report appendices.

Note: Comparative word clouds can be produced in the same way to compare say male versus female responses, or indeed other categories of interest e.g. traditional owners, different age groups, number of years living in Gladstone etc. In this case when the data is first transferred across from the raw CATI results (on the first Excel worksheet entitled 188-GHHP 2015) the column for indicating if the respondent is male or female (Column D) should also be transferred to the new worksheet. The data on the new worksheet is then sorted by that column in order to separate the word set into a male response word set and a female response word set. Then each word set is copied into Wordle to produce two separate word clouds showing the comparative responses.

Appendix C GHHP survey questions mapped to indicators and measures

Question	Component	Indicator	Sub-indicators	Measures
• 48: I believe the Traditional Owners of the Gladstone Harbour area are well consulted by the regional managers • 47: I believe the traditional sites and customs in the Gladstone Harbour area are well protected	Cultural	Cultural heritage	Protected cultural heritage sites	Perception of appropriate level of traditional owner consultation Traditional site protection
• 30: There are other places that are better than the Gladstone Harbour region for the recreational activities that I do • 50: The Gladstone harbour area is part of who I am[3]	Cultural	Sense of place	Measures of distinctiveness	No place better Who I am
• 3: How long have you lived in the Gladstone region? • 52: I do not plan to be a resident of this region in the next 5 years	Cultural	Sense of place	Continuity	How long lived in the area Stay five years?
• 49: I feel proud that I live in the Gladstone community	Cultural	Sense of place	Self esteem	Proud to live in the area
• 51:The Gladstone Harbour area improves my quality of life • 46: I feel able to have input into the management of the Gladstone Harbour if I choose to	Cultural	Sense of place	Self efficacy	Quality of life Input into management
• 53:The Gladstone Harbour is a key part of the Gladstone community	Cultural	Sense of place	Attitudes to Gladstone harbour	Key part of the community Great asset to the region Great asset to Queensland
• 54: I value the Gladstone Harbour area because it supports a variety of marine life • 55: I value the Gladstone Harbour area because it provides opportunities for outdoor recreation • 56: I value the Gladstone Harbour area because it attracts visitors to the region • 57: The Gladstone Harbour area is a great asset for the economy of this region	Cultural	Sense of place	Values and attitudes	Variety of marine life Opportunities for outdoor recreation Attracts visitors to the region

Question	Component	Indicator	Sub-indicators	Measures
• 58: I value the Gladstone Harbour area because I enjoy the scenery and sights • 59: I value the Gladstone Harbour area because there are culturally special places • 60: I value the Gladstone Harbour area because it has historical significance that matters to me				Enjoy scenery and sights Spiritually special places Culturally special places Historical significance
• 29: I have fair access to Gladstone Harbour compared to other users of the harbour	Social	Harbour access	Access to harbour	Satisfaction with harbour access
• 6a: In the previous 12 months, did you visit Gladstone Harbour at all? • 6b): If yes: were any of these visits for recreation (not including visits where you paid a tour or ferry operator)?	Social	Harbour access	Satisfaction with ramps and public spaces	Frequency of use
• 10: 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.	Social Economic	Harbour access Economic values (Recreation)	Satisfaction with ramps and public spaces Beach recreation	Frequency of use Beach recreation satisfaction - Travel Cost questions
9: In the previous 12 months have you visited the following beaches in the Gladstone Harbour area? Barney Point Spinnaker Park artificial beach Boyne Is Tannum Sands Other (please specify)	Economic	Economic values (Recreation)	Beach recreation	Beach recreation satisfaction - Travel Cost questions
• 11: Thinking of the last trip you made to a beach in the Gladstone Harbour area, how satisfied were you overall with your experience?	Social Economic	Harbour access Economic values (Recreation)	Satisfaction with ramps and public spaces Beach recreation	Frequency of use Beach recreation satisfaction - Travel Cost questions
8: 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.	Economic	Economic values (Recreation)	Land based recreation	Land based recreation satisfaction - Travel Cost questions

Question	Component	Indicator	Sub-indicators	Measures
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				
• 12: In the last 12 months did you undertake any of the following shore-based activities in the Gladstone harbour area? ***Note:*** *the list is not intended to be comprehensive – more to focus the respondents.* Walking Cycling Running Picnicking or barbecuing ~~Shore-based fishing (including jetties)~~ Asked in 2014 removed 2 Relaxing by the water Sporting events Community events Asked in 2015 (not 2014)	Economic	Economic values (Recreation)	Land based recreation	Land based recreation satisfaction - Travel Cost questions

Question	Component	Indicator	Sub-indicators	Measures
Other (specify)				
13: In the last year, how often have you done shore-based recreation in the Gladstone Harbour area? 14: Thinking of the last shore-based recreation trip you made in the Gladstone Harbour area, how satisfied were you overall with your experience? 15: In the last 12 months, did you undertake any recreational fishing trips, either shore-based or boat based, in the Gladstone Harbour? YES/NO a. If YES how often have you been recreational fishing in the Gladstone Harbour area??	Social Economic	Harbour access Economic values (Recreation)	Satisfaction with ramps and public spaces Land based recreation	Frequency of use Land based recreation satisfaction - Travel Cost 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	

Question	Component	Indicator	Sub-indicators	Measures
About once a year | | 1 | |				
16: Thinking back to the last time you went fishing in the Gladstone harbour area , how did you get to where you first accessed the Gladstone harbour area from your home? i.e. What form of transport did you use? (more than one response allowed) Walk Bicycle Motor vehicle Bus — Asked in 2014 removed 2015 Other — Asked in 2015 (not 2014)	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions
• 17: Approximately how many kilometres is it from your home to where you first accessed the harbour? _____ kms	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions
• 18: Approximately how long did it take to get there (one way) _____ hrs _____ mins	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions
• 19: How many people did you go with? Count only those, including yourself, in the same vehicle as you. No of adults (including yourself) No of children (16 yrs and under)	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions
• 20): Approximately how long did your recreational activity last? _____ hrs (use proportion if required)	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions
21: Did you spend most of your time doing this activity or do other activities as well such as shopping or visiting friends? Spent most of the time doing this activity — Yes/No **If you did other things as well**, approximately what proportion of your time was spent doing the recreational activity *Do not include travel time* — % of time	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions

Question	Component	Indicator	Sub-indicators	Measures
• 22: Did your activity involve the use of a boat? _____ Yes/ No	Social Economic	Harbour access Economic values (Recreation)	Satisfaction with ramps and public spaces Recreational fishing	Frequency of use Travel Cost questions
• 23: Approximately how many kms or nautical miles did you travel by boat? _____ kms or _____ nautical miles	Economic	Economic values (Recreation)	Recreational fishing	Travel Cost questions
• 24: Roughly how many L or $ worth of fuel did you use? _____L or $ _____				
• 4: Do you own a boat? Yes/No • 7: 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	Social Economic	Harbour access Economic values (Recreation)	Satisfaction with ramps and public spaces Beach recreation Recreational fishing Land based recreation	Frequency of use Travel Cost questions
• 26: I am satisfied with the level of public access and spaces to the Gladstone Harbour region • 27: I am satisfied with the number of boat ramps available in the Gladstone Harbour region •	Social	Harbour access	Satisfaction with ramps and public spaces	Access to public spaces Number of ramps Frequency of use
• 33: The Gladstone Harbour region is not in great condition • 34: I feel optimistic about the future health of the Gladstone Harbour • 35: The health of the harbour has improved in the past 3 years	Social	Harbour access	Perceptions of harbour health	Great condition Optimistic about future health Improved over the last 12 months
• 36: Marine debris and litter is not a problem in Gladstone Harbour • 37:The amount of marine debris and litter in Gladstone Harbour affects my access to the area	Social	Harbour access	Barriers to access	Marine debris a problem Marine debris affects access

Question	Component	Indicator	Sub-indicators	Measures
• 31: The amount of commercial shipping in Gladstone Harbour has reduced my use of the area • 32: The amount of recreational boating activity in Gladstone Harbour has reduced my use of the area				Shipping reduced use Recreational boats reduced use
• 25: Thinking of this recreational trip to the Gladstone Harbour area, how satisfied were you overall with your experience? • 28: I am satisfied with the quality of boat ramps available in the Gladstone Harbour region • 28a: I am satisfied with facilities associated with boat ramps in the Gladstone Harbour area	Social	Harbour usability	Satisfaction with harbour recreational activities	How satisfied with last trip Quality of ramps and facilities
• 39: I think water quality in Gladstone Harbour is in good condition • 41: The water quality in Gladstone Harbour has not affected how often I use the area in the last 12 months • 40: I think air quality in Gladstone Harbour is in good condition	Social	Harbour usability	Air and water quality	Water quality satisfaction Water quality does not affect use of the harbour Air quality satisfaction
• 42: I would be happy to eat seafood caught in the Gladstone Harbour area	Social	Harbour usability	Harbour safety	Happy to eat seafood
• 43: I feel safe being in the Gladstone Harbour area at night		Harbour usability	Harbour safety	Safe at night
• 44: Gladstone Harbour makes living in Gladstone a better experience • 45: I rarely participate in community events in the Gladstone Harbour area	Social	Liveability and wellbeing	Contribution of harbour to liveability and wellbeing	Makes living in Gladstone a better experience Participate in community events
Demographic questions only – note that the travel cost questions are included above)				
• 63: Age ranges	Economic	Economic stimulus	Socioeconomic status (IER)[1]	Relative standing of Index of Access to Economic Resources compared to other regions
• 64: Sex of respondent	Economic	Economic stimulus	Socioeconomic status	As above
• 65: Do you identify as a traditional owner of the region?	Economic	Economic stimulus	Socioeconomic status	As above

Question	Component	Indicator	Sub-indicators	Measures
• 66: Household income (ranges)	Economic	Economic stimulus	Socioeconomic status	As above
• 67: Household composition: number of adults (> 18 years old)	Economic	Economic stimulus	Socioeconomic status	As above
• 68: Household composition: number of children > 15 years old	Economic	Economic stimulus	Socioeconomic status	As above
• 69: Household composition: number of children < 15 years old	Economic	Economic stimulus	Socioeconomic status	As above
• 70: Employment status: Is any adult in the household unemployed? (exclude stay at home mums/dads not actively seeking work)	Economic	Economic stimulus	Socioeconomic status	As above
• 71: Employment status: Is any adult in the household self unemployed?	Economic	Economic stimulus	Socioeconomic status	As above
• 72: Is your home: owned with a mortgage/ owned without a mortgage/ rented	Economic	Economic stimulus	Socioeconomic status	As above
• 72a: If owned with a mortgage, is your mortgage repayment greater than $3000/month	Economic	Economic stimulus	Socioeconomic status	As above
• 72b: If rented, is your rent payment greater than $175/week	Economic	Economic stimulus	Socioeconomic status	As above
• 73: Does your household have a car?	Economic	Economic stimulus	Socioeconomic status	As above
• 74: How many bedrooms does your house have?	Economic	Economic stimulus	Socioeconomic status	As above

Notes:

[1] *The Index of Economic Resources: The IER summarises variables relating to the financial aspects of relative socioeconomic advantage and disadvantage. These include indicators of high and low income, as well as variables that correlate with high or low wealth. Areas with higher scores have relatively greater access to economic resources than areas with lower scores.*

[2] Questions for word cloud analysis are not listed in the table above; they are question 5: When you think of the Gladstone Harbour area what are the first three words that come into your mind & 7a: 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.

[3] SELTMP questions are comparable with some of the questions above. For example, SELTMP Q4 is comparable to Q45, SELTMP Q15 is comparable to Q50, SELTMP Q13 & Q25 is comparable to Q53, SELTMP Q 27 is comparable to Q49, and SELTMP Q29 & Q30 are comparable to Q51.

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