Final Report on the Status of the Social, Cultural (Sense of place) and Economic Components for the 2022 Gladstone Harbour Report Card

Jeremy De Valck

School of Business and Law

CQUniversity

Final Report

29 July 2022

Prepared for the Gladstone Healthy Harbour Partnership

Acknowledgements

Citation

De Valck, J., 2022. Final report on the status of the Social, Cultural (Sense of place) and Economic components for the 2022 Gladstone Harbour Report Card. CQUniversity. Draft report to the Gladstone Healthy Harbour Partnership, July 2022.

Summary

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

The Gladstone Harbour Report Card is produced annually and 2022 is the ninth year of reporting. The report card encapsulates environmental, social, cultural and economic objectives which were last assessed in 2019. The focus of this report is on the last three components. The methods used in this report are the exact same as in prior editions (e.g. De Valck et al., 2019). The most up-to-date data were collected to update all data sets based on data availability (see Appendix), which means that not all data sets contain data going as far as 2022.

Assessment and analysis

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

Baseline data, used to calculate the scores for the indicator measures, are collected from both primary and secondary sources. Primary data are collected through a community survey of 200 respondents residing in the Gladstone area. Since 2017, mobile phone as well as landline numbers have been used to recruit respondents in the Computer Assisted Telephone Interview (CATI) survey. In 2022, respondents were interviewed using mobile phone numbers. Secondary data are obtained from a range of regularly updated, publicly available sources.

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

Assessment modifications

In 2022 four modifications were suggested in the research proposal based on recommendations from the 2019 report (De Valck et al., 2019).

1. **"Weightings"**

The 'Community objective weightings' ('objectivedata.csv' data file) and 'Social scientist survey weighting information' ('SIdata.csv' data file) should ideally be updated in 2022 through new surveys

as these still rely on data that was collected in 2014 (Pascoe et al., 2014). However, in agreement with the ISP, it was decided not to make this modification in 2022 due to time and budget constraints.

2. Data Envelopment Analysis (DEA)

The data envelopment analysis (DEA) used to produce the 'Shipping activity' scores may require revision as this score seems to have reached a plateau since 2017. This could be due to the frontier used to calculate this score. A frontier that progressively adjusts to export/import figures year after year could be a better option. Again, in agreement with the ISP, it was decided not to modify the DEA part of the script in 2022 due to time and budget constraints.

3. Update land-based recreation value

The 'Land-based recreation' indicator should ideally be updated because this indicator still relies on a travel cost value calculated in 2014 (Pascoe et al., 2014). New data were collected in 2022 through the CATI survey. Unfortunately, despite many attempts and data manipulation, it was not possible to make a travel cost model converge with the newly collected land-based recreation data. Therefore, the decision was made to keep using the travel cost parameters from 2019.

4. CATI survey (N=200)

In 2019, 439 survey responses were collected through a mix of landlines, mobile phones and the Internet. In 2022, it was decided with the ISP to only collect 200 responses via a CATI survey. A separate survey (QLD Government deliverable) is to be conducted by GHHP via social media to obtain 200 responses for the Human Dimensions indicator.

Overall results

A 'snapshot' impression of the harbour was captured from the community survey respondents when they were asked to provide three words to describe the harbour. The words that dominated were 'Beautiful' and 'Fishing' (like in previous years), followed by words evoking the industrial nature of the harbour ('Busy', 'Industry', 'Industrial'). The importance of fishing is incorporated into the report card in terms of the economic value of both commercial and recreational fishing. The importance of industrial activity is incorporated into the report card as an indicator in the Economic component.

Social

The overall grade for the social component is a B. The underlying score of 0.68 is an improvement of 1-point since 2019, and 10-points since 2014 (Table E1). Overall, we note that the social component continues to generate better scores across the three indicator groups since the 2014 baseline. Despite a few remaining pollution-related concerns (air quality, oil spills, marine debris), the Gladstone Harbour is increasingly seen as a pleasant and beautiful area that offers a good range of facilities and recreational activities.

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

Social component: 2022 = 0.68 (B) 2019 = 0.67 (B); 2014 = 0.58 (C)									
Indicator Group	**Score**	**Indicators**	**Score**			**Measures**	**Score**		
			2022	**2019**	**2014**		**2022**	2019	2014
Harbour usability	**0.62 (C)** *2019: 0.64 2014:0.60*	Satisfaction with harbour recreational activities	**0.73**	0.71	0.70	How satisfied last recreational trip	**0.76**	0.74	0.74
						Quality of ramps and facilities	**0.66**	0.67	0.63
		Perceptions of air and water quality	**0.59**	0.58	0.46	Water quality satisfaction	**0.60**	0.58	0.39
						Air quality satisfaction	**0.47**	0.48	0.40
						Water quality does not affect harbour use	**0.69**	0.67	0.58
		Perceptions of harbour safety for human use	**0.55**	0.63	0.38	Marine safety incidents	**0.46**	0.54	0.24
						Oil spills	**0.38**	0.66	0.15
						Safety at night	**0.69**	0.62	0.58
						Happy to eat seafood	**0.69**	0.68	0.55
Harbour access	**0.68 (B)** *2019: 0.67 2014: 0.61*	Satisfaction with access to the harbour	**0.75**	0.73	0.67	Fair access to harbour	**0.75**	0.73	0.67
		Satisfaction with boat ramps + public spaces	**0.67**	0.65	0.60	Frequency of use	**0.51**	0.51	0.46
						Number of boat ramps	**0.70**	0.69	0.65
						Access to public spaces	**0.77**	0.74	0.68
		Perceptions of harbour health	**0.63**	0.63	0.53	Great condition	**0.68**	0.68	0.54
						Optimistic about future health	**0.62**	0.63	0.56
						Improved over the last 12 months	**0.60**	0.59	0.50
		Perceptions of barriers to access *(Note: scores are reversed. A higher score denotes a decrease in the barrier)*	**0.69**	0.66	0.64	Marine debris a problem	**0.51**	0.48	0.51
						Marine debris affects access	**0.74**	0.72	0.70
						Shipping reduced my use	**0.74**	0.69	0.63
						Recreation boats reduced my use	**0.74**	0.72	0.69
Liveability wellbeing	**0.71 (B)** *2019: 0.70 2014: 0.64*	Liveability and wellbeing	**0.71**	0.70	0.64	Makes living in Gladstone a better experience	**0.78**	0.76	0.71
						Participate in community events	**0.55**	0.56	0.53
						Aesthetic value	**0.76**	0.73	na

From the 2014 baseline, there is still a 2-point improvement in the 'Harbour usability' score. However, we observe that, since 2019, there has been a 2-point drop (from 0.64 to 0.62). This drop comes from the 8-point decline in people's perception of harbour safety for human use. This year's oil spill and marine incident figures[1] have worsened compared to 2019: from 0.66 to 0.38, and from 0.54 to 0.46, respectively. Over the 2018-2020 period, 1360 (from 47,755 to 49,115) new vessels were registered in Gladstone. The increased traffic could be one of the reasons for the higher number of maritime incidents. We also note that many oil spill incidents reported in 2020 represent small amounts (in litres) whereas more pollution events in past years were reported in surface terms. So, this could simply be a data-entry artefact. Another area of concern for many respondents is the perceived air quality in Gladstone Harbour (0.47, one-point drop from 2019).

'Harbour access' seems to continue making sustained improvements. At the exception of one single measure ('Optimistic about future health') which dropped by one point, all other harbour access measures either scored higher or similar to 2019. However, this measure still remains six points higher than in 2014. The largest improvement relates to the 'Shipping reduced my use' measure, which improved by five points since 2019. This suggests that Gladstone residents are largely unimpacted by commercial shipping in their recreational activities. On the contrary, 'marine debris' remains an issue for many respondents, with that measure scoring slightly better than in 2019 but remaining one of the lowest (0.51).

The 'Liveability and wellbeing' indicator group has improved by one point from 2019, and by seven points from the 2014 baseline. There seems to be a steady trend in people's perception of Gladstone Harbour as an essential part of the experience of living in Gladstone. Respondents are also generally happy with the aesthetics of the harbour. By contrast, many respondents state that they rarely participate in community events in the Gladstone Harbour area, which sends the signal that some improvements should still be made in that regard.

Cultural ('Sense of place')

We observe a continuing improvement in the score for the indicator group over time, with a 2-point improvement since 2019 and a 4-point change from the 2014 baseline (Table E2). Interestingly, there is also an improvement in all indicator scores this year. The 'Continuity' indicator has recorded the largest improvement from 2019 and from the 2014 baseline (seven and eight points respectively). However, this could just be a temporary effect due to Covid-related lockdown and borders closure circumstances which largely restrained mobility over the past two years.

The 'Appreciation' indicator continues to generate the highest score, sending a positive signal on how residents feel about the harbour. Similarly, we see that 'Pride in the region' continues to increase over the years, showing a 2-point rise since 2019.

The 'Values' indicator keeps rising, thanks to the good scores received for the scenery and outdoor recreation measures. By contrast, the three measures related to cultural, spiritual and historical significance of the area still receive low scores (0.55, 0.54 and 0.57, respectively).

---

[1] Note: Due to data availability issues with the Queensland Government, the 10-year data array used to construct the oil spill and marine incident scores relied on data ranging from 2011 to 2020, instead of 2012-2021. In 2019, a 2009-18 array had been used.

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

Indicator group Score/grade	Indicators	Score			Measures	Score		
		2022	2019	2014		**2022**	2019	2014
Cultural component ('Sense of place') **0.68** **(B)** *2019: 0.66* *2014: 0.64*	Place attachment	**0.61**	0.58	0.55	No place better	**0.56**	0.51	0.49
					Who I am	**0.65**	0.64	0.61
	Continuity	**0.65**	0.58	0.57	How long lived in area	**0.55**	0.44	0.46
					Plan to stay the next 5 years	**0.76**	0.71	0.68
	Pride in the region	**0.76**	0.74	0.69	Feel proud living in Gladstone	**0.76**	0.74	0.69
	Well-being	**0.62**	0.61	0.55	Quality of life	**0.69**	0.69	0.64
					Input into management	**0.55**	0.54	0.46
	Appreciation of the harbour	**0.84**	0.83	0.80	Key part of community	**0.82**	0.82	0.79
					Great asset to region	**0.83**	0.82	0.79
					Great asset to Queensland	**0.83**	0.81	0.81
	Values	**0.68**	0.66	0.64	Variety of marine life	**0.72**	0.73	0.64
					Opportunities for outdoor recreation	**0.79**	0.78	0.76
					Affects visitors to the region	**0.74**	0.73	0.67
					Enjoy scenery and sights	**0.79**	0.76	0.75
					Spiritually special places	**0.54**	0.50	0.52
					Culturally special places	**0.55**	0.51	0.50
					Historical significance	**0.57**	0.52	0.58

Economic

The overall grade for the Economic component is a B (score of 0.76) which is a three-point improvement from 2019 and a one-point improvement from 2014. The higher score in 2022 is a result of improving socio-economic status (+ 10 points) and declining unemployment (+ 1 point) (Table E3). There has been no change in the score for 'Economic performance' (0.90) and little change for 'Economic value (recreation)' (from 0.76 to 0.77).

'Economic performance' continues to be dominated by 'Shipping' ($517M, 2021 figure) and 'Tourism' ($305M, 2019 figure). The economic value of recreation increased in importance with the inclusion of a fourth indicator for water-based recreation in 2018. In 2022, recreation has an estimated value of $241M, i.e. 79% of the estimated value for tourism. In particular, the estimated value of recreational fishing ($61.2M in 2022) is considerably higher than commercial fishing ($0.53M in 2022) in the harbour.

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

Indicator group Score/grade	Indicators	Score			Measures	Score		
		2022	2019	2014		2022	2019	2014
Economic performance 0.90 (A) *2019: 0.90* *2014: 0.83*	Shipping activity	**0.90**	0.90	0.83	Shipping activity: productivity	0.90	0.90	0.83
	Tourism	**0.90**	0.90	0.60	Tourism expenditure	0.90	0.90	0.60
	Commercial fishing	**0.41**	0.36	0.66	Net fisheries: productivity	0.45	0.25	na
					Trawl fisheries: productivity	0.31	0.29	na
					Pot fisheries: productivity	0.55	0.64	na
Economic stimulus 0.64 (C) *2019: 0.58* *2014: 0.87*	Employment	**0.45**	0.44	0.72	Unemployment statistics for the Gladstone LGA	0.45	0.44	0.72
	Socio-economic status	**0.74**	0.64	0.90	Index of economic resources	0.74	0.64	0.90
Economic Value (Recreation) 0.77 (B) *2019: 0.76* *2014: 0.75*	Land-based recreation	**0.79**	0.77	0.76	Satisfaction rating from CATI survey + value from 2014 survey	**0.79**	0.77	0.76
	Recreational fishing	**0.73**	0.71	0.67	Satisfaction rating from CATI survey + value from 2015 survey	**0.73**	0.71	0.67
	Beach recreation	**0.77**	0.76	0.71	Satisfaction rating from CATI survey + value from 2014 survey	**0.77**	0.76	0.71
	Water-based recreation	**0.77**	0.76	na	Satisfaction rating from CATI survey + value from 2017 survey	**0.77**	0.76	na

Economic component: 2022 = 0.76 (B); 2019 = 0.73; 2014: 0.75

We observe that 'Economic stimulus' has recorded a 6-point increase since 2019, but has declined by 23 points since 2014. A decline in the socio-economic conditions in the Gladstone area seems to be the cause of that decline. However, we do note a 10-point recovery in the socio-economic status indicator since 2019. This could be explained by the fact that the Gladstone area might have been less heavily impacted by Covid-related socio-economic disruptions than larger urban areas in Australia.

The 'Economic Value (Recreation)' indicator group scores slightly better than in 2019 and remains on a continuously improving trend since 2014. All four types of recreation appear to be greatly valued by Gladstone residents and represent an important element of the Gladstone lifestyle. Different travel costs were tested this year in order to update land-based recreation values, and relying on the newly collected CATI data. Unfortunately, despite numerous attempts, it was not possible to make these models converge. It could be that values for other types of recreation are confounded with land-related ones. As a result, it was decided in agreement with the ISP to reuse the trip values from 2019 this year (see Table D2, p. 100 in De Valck et al., 2019).

Recommendations

1. Oil spill and marine incident measures might need to be adapted

Because of the large impacts year-to-year variations in oil spill and marine incident measures have on the overall 'Harbour usability' score, these measures could need to be adapted in future report cards. For instance, 'oil spill data' reports on the total number of marine pollution events that occurred in each maritime region in a given calendar year. Not all of these events are oil spill events per se; some of them are bilge, sewage, garbage, etc. Moreover, each of these events—small or large—is given equal weight since we only use the total number of events. So, a year with a large number of small events reported produces a worse score than a year reporting one single but catastrophic event. Using a volume-based measure would be more adequate but events are generally reported as ballpark estimates so inaccuracies would remain anyway.

Some of the recommendations made in 2019 could not be addressed this year and remain relevant for future editions of the GHHP Report Cards.

2. Weightings

The 'Community objective weightings' ('objectivedata.csv' data file) and 'Social scientist survey weighting information' ('SIdata.csv' data file) should ideally be updated next year through new surveys as these still rely on data that was collected in 2014 (Pascoe et al., 2014).

3. DEA

The data envelopment analysis (DEA) used to produce the 'Shipping activity' scores might require revision next year as this score seems to have reached a plateau since 2017, which could be due to the frontier used to calculate this score. A frontier that progressively adjusts to export/import figures year after year could be a better option.

References

DE VALCK, J., STAR, M. & FLINT, N. 2019. Final Report on the Status of the Social, Cultural (Sense of place) and Economic Components for the 2019 Gladstone Harbour Report Card. Final report to the Gladstone Healthy Harbour Partnership, September 2019.

PASCOE, S., TOBIN, R., WINDLE, J., CANNARD, T., MARSHALL, N., KABIR, Z. & FLINT, N. 2014. Piloting of social, cultural and economic indicators for the Gladstone Healthy Harbour Partnership Report Card. CSIRO Final report for the Gladstone Healthy Harbours Partnership, 182 pp.

PASCOE, S., TOBIN, R., WINDLE, J., CANNARD, T., MARSHALL, N., KABIR, Z. & FLINT, N. 2016. Developing a Social, Cultural and Economic Report Card for a Regional Industrial Harbour. *PLoS ONE,* 11.

Appendix

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

Indicator Groups	Indicators	Measures	Data Source	Baseline data
Harbour usability	Satisfaction with harbour recreational activities	How satisfied with last trip	CATI Survey (avg: Questions: Q11b, Q12b1, Q15b, Q25)	10-point scale
		Quality of ramps and facilities	CATI Survey (avg: Q28, Q28a)	10-point scale
	Air and water quality	Water quality satisfaction	CATI Survey (Q40)	10-point scale
		Air quality satisfaction	CATI Survey (Q41)	10-point scale
		Water quality does not affect use of the harbour	CATI Survey (Q42)	10-point scale
	Harbour safety	Marine safety incidents	*Marine incidents in Queensland 2020* Department of Transport & Main Roads, Maritime Safety Queensland	Data 2011-2020 (calendar year). Rate of incidents in Gladstone maritime region compared to other Qld regions
		Oil spills	Queensland Dept. Transport and Main Roads, *Maritime Safety Queensland Branch, 2019-2020 and 2020-2021*	Data 2011-2020 (calendar year). Rate of incidents in Gladstone maritime region compared to other Qld regions
		Safe at night	CATI Survey (Q44)	10-point scale
		Happy to eat seafood	CATI Survey (Q43)	10-point scale
Harbour access	Satisfaction with access to the harbour	Fair access to harbour	CATI Survey (Q29)	10-point scale
	Satisfaction with ramps and public spaces	Frequency of use	CATI Survey (Q8)	10-point scale
		Number of ramps	CATI Survey (Q27)	10-point scale
		Access to public spaces	CATI Survey (Q26)	10-point scale
	Perceptions of harbour health	Great condition	CATI Survey (Q33)	10-point scale
		Optimistic about future health	CATI Survey (Q34)	10-point scale
		Improved over the last 12 months	CATI Survey (Q35)	10-point scale
	Barriers to access	Marine debris a problem	CATI Survey (Q36)	10-point scale
		Marine debris affects access	CATI Survey (Q37)	10-point scale
		Shipping reduced use	CATI Survey (Q31)	10-point scale
		Recreational boats reduced use	CATI Survey (Q32)	10-point scale
Liveability and wellbeing	Contribution of harbour to liveability and wellbeing	Makes living in Gladstone a better experience	CATI Survey (Q45)	10-point scale
		Participate in community events	CATI Survey (Q46)	10-point scale
		Aesthetic value	CATI Survey (Q45a, Q45b))	10-point scale

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

Indicator Group	Indicators	Measures	Data source	Baseline data
Sense of Place	Place attachment	No place better	CATI survey (Q30)	10-point scale
		Who I am	CATI survey (Q51)	10-point scale
	Continuity	How long lived in the area	CATI survey (Q3)	10-point scale
		Stay in area five years?	CATI survey (Q53)	10-point scale
	Pride in the region	Proud living in the area	CATI survey (Q50)	10-point scale
	Well-being	Quality of life	CATI survey (Q52)	10-point scale
		Input into management	CATI survey (Q47)	10-point scale
	Appreciation of the Harbour	Key part of the community	CATI survey (Q54)	10-point scale
		Great asset to the region	CATI survey (Q58)	10-point scale
		Great asset to Queensland	CATI survey (Q59)	10-point scale
	Values	Variety of marine life	CATI survey (Q55)	10-point scale
		Opportunities for outdoor recreation	CATI survey (Q56)	10-point scale
		Affects visitors to the region	CATI survey (Q57)	10-point scale
		Enjoy scenery and sights	CATI survey (Q60)	10-point scale
		Spiritually special places	CATI survey (Q61)	10-point scale
		Culturally special places	CATI survey (Q62)	10-point scale
		Historical significance	CATI survey (Q63)	10-point scale

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

Indicator group	Indicator	Measure	Data source	Baseline data
Economic Performance	Shipping activity	Shipping activity productivity calculated from monthly shipping movements by cargo type (2021-22 financial year)	Gladstone Ports Corporation (GPC)	Time series data from 2012-13 to 2021-2022
	Tourism expenditure	Gladstone region's total tourism expenditure output (2018-19 financial year)	Tourism Research Australia's information at the LGA level (Gladstone): https://www.tra.gov.au/Region al/local-government-area-profiles.	10-year average 2009-10 to 2018-19
	Commercial fishing	Productivity of net fisheries	**Production (fishing effort)** Queensland Fishing (QFish), Queensland Department of Agriculture and Fisheries **Prices (fish, prawns & crabs)** ABARES – Australian fisheries and aquaculture statistics 2020 (published Aug 2021)	10-year average (time series data from 2012-13 to 2021-22
		Productivity of trawl (otter) fisheries		
		Productivity of pot fisheries		
Economic stimulus	Employment	Gladstone LGA unemployment data (2021 Dec quarter)	Australian Department of Employment, *Small Area Labour Markets*	Queensland 2021 distribution (Dec quarter)
	Socio-economic status	Index of economic resources derived from 2016 ABS census and updated using the community CATI survey	2022 CATI survey; Australian Bureau of Statistics, 2016 census	Australian 2016 distribution
Economic value (Recreation)	Land-based recreation	Land-based recreation satisfaction + economic value	*Satisfaction*: CATI survey + economic value (Pascoe et al. 2014)	10-point scale
	Recreational fishing	Recreational fishing satisfaction + economic value	Satisfaction: CATI survey + 2018 updated economic value (Cannard et al., 2015; Windle et al., 2018)	10-point scale
	Beach recreation	Beach recreation satisfaction + economic value	Satisfaction: CATI survey + 2019 updated economic value	10-point scale
	Water-based recreation	Water-based recreation satisfaction + economic value	Satisfaction: CATI survey + economic value (Windle et al. 2017)	10-point scale