



**RESULTS FOR**  
THE MACKAY-WHITSUNDAY-ISAAC  
2018 REPORT CARD

# HUMAN DIMENSION INDICATORS



HEALTHY RIVERS TO  
REEF PARTNERSHIP  
MACKAY-WHITSUNDAY-ISAAC

## Authorship statement

The Mackay-Whitsunday-Isaac Healthy Rivers to Reef Healthy Partnership (Partnership) Human Dimension Indicator Results (reporting year 1<sup>st</sup> July 2017 to 30<sup>th</sup> June 2018) for the Mackay-Whitsunday-Isaac 2018 Report Card technical report was compiled by the Partnership's Technical Officers, Alysha Lee and Jessica Gillespie.

Substantial input was received from the Regional Report Cards Technical Working Group (TWG) members. Some content was also drawn from previous Mackay-Whitsunday-Isaac technical reports and associated report cards.

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## Terms and Acronyms

<b>BMP</b>	Best Management Practice
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>DAF</b>	Department of Agriculture and Fisheries
<b>DES</b>	Department of Environment and Science
<b>Driver</b>	An overarching cause of change in the environment
<b>ECO</b>	Eco Tourism
<b>Ecosystem</b>	A dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit
<b>GBR</b>	Great Barrier Reef
<b>GBR report card</b>	Great Barrier Reef Report Card developed under the Reef 2050 Water Quality Improvement Plan (2018)
<b>GBRMPA</b>	Great Barrier Reef Marine Park Authority
<b>Index</b>	Is generated by indicator categories (e.g. water quality made up of nutrients, water clarity, chlorophyll- <i>a</i> and pesticides)
<b>Indicator category</b>	Is generated by one or more indicators (e.g. nutrients made up of particulate nitrogen and particulate phosphorus)
<b>Indicator</b>	A measure of one component of an environmental dataset (e.g. particulate nitrogen)
<b>IRC</b>	Isaac Regional Council
<b>ISP</b>	Independent Science Panel established in 2009 under the Reef Plan, who have independently reviewed the methodologies involved in the report card assessments. They are a working group of the Reef 2050 Independent Expert Panel that provides broader scientific advice on implementing the Reef 2050 Long-Term Sustainability Plan <sup>1</sup> .
<b>JCU</b>	James Cook University
<b>MRC</b>	Mackay Regional Council
<b>NQBP</b>	North Queensland Bulk Ports

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<sup>1</sup> <https://www.reefplan.qld.gov.au/science-and-research/independent-panel>

<b>OGBR</b>	Office of the Great Barrier Reef
<b>Overall score</b>	The overall scores for each reporting zone used in the report card are generated by an index or an aggregation of indices
<b>Ports</b>	NQBP port authority
<b>QBFP</b>	Queensland Boating and Fishing Patrol
<b>RIMMReP</b>	Reef 2050 Plan Integrated Monitoring, Modelling and Reporting Program
<b>SELTMP</b>	The Social and Economic Long-Term Monitoring Program (SELTMP)
<b>SE</b>	Standard Error
<b>TORG</b>	Traditional Owner Reference Group
<b>WRC</b>	Whitsunday Regional Council
<b>WT</b>	Wet Tropics
<b>User</b>	Describes those in the community or industry who may have affinity, dependency or vulnerability to the outcomes of the GBR and it's surrounds.

## 1. Introduction

### 1.1. Purpose of this Document

The purpose of this document is to provide detailed results to support the 2018 Mackay-Whitsunday-Isaac report card on waterway health. The results provided in this document address selected human dimensions of environmental management, which include social and economic values, agricultural and non-agricultural stewardship, and cultural heritage assessments. For results on environmental reporting, refer to the Mackay-Whitsunday-Isaac 2018 report card environmental indicators report<sup>1</sup>.

This document presents indicator scores in their original scale along with standardised scores that (where relevant) were used for aggregation. Confidence in the results is also reported in this document for all standardised scores, with the exception of social and economic indicators (see Section 2.1).

Where practicable, the 2018 report card results are compared to the relevant report card results from previous years. Due to considerable updates in the methodology for calculating social and economic scores, and updates to benchmarks for agricultural stewardship, there are few comparisons able to be made across reporting years; however this work represents a strong commitment to advancing the quality of condition assessments. For each dimension, the data collection period is outlined with the associated results.

This document describes:

- The 2018 condition assessments for human dimensions, including;
  - Social and economic;
  - Agricultural stewardship;
  - Non-agricultural stewardship; and
  - Cultural heritage assessments.
- The confidence associated with condition scores, with the exception of social and economic indicators;
- Where practicable, comparison of 2017 results to 2016, 2015 and 2014 results.

### 1.2. General

The Mackay-Whitsunday-Isaac Healthy Rivers to Reef Partnership (Partnership) was established in October 2014. The primary focus of the Partnership is to produce an annual report card on the ecological condition of the region's waterways.

The report card includes environmental assessments of five freshwater basins, eight estuaries, four inshore marine zones and one offshore marine zone (to the eastern boundary of the Great Barrier Reef Marine Park). Different indicators are assessed to provide the overall scores for these reporting areas throughout the Mackay-Whitsunday-Isaac Region. The report card also assesses human dimension indicators in the region in an effort to advance planning and management of the GBR and its surrounds through informed decision-making, incorporating long-term data on industry and

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<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>



community relationships, vulnerabilities and dependencies on the natural resource (Marshall et al, 2015)<sup>1</sup>.

Since the release of the 2017 report card, the Mackay-Whitsunday-Isaac Program Design outlining the guiding framework for the development and scope of the 2017 – 2022 report cards was finalised.

For more detail on the methods used to produce the Mackay-Whitsunday-Isaac report card and for more information on the Partnership, refer to the Methods for the Mackay-Whitsunday-Isaac 2018 report card document<sup>2</sup> and the Mackay-Whitsunday-Isaac Report Card Program Design 2017 to 2022 document<sup>3</sup>. These documents may hereafter referred to as the methods and program design reports, respectively.

### 1.3. Conceptual Diagram

Following the development of the Partnership visions and objectives, existing conceptual diagrams were reviewed to assist in identifying pressures in the Region and prioritise potential indicators. A new conceptual diagram for the Mackay-Whitsunday-Isaac Region was then developed for the Partnership to accurately show the drivers, pressures, impacts and responses in the region.



**Figure 1. Conceptual Diagram depicting the regional drivers, pressures and environmental pathways and receptors within the Mackay-Whitsunday-Isaac region.**

This conceptual model is also pivotal to understanding the human dimensions of environmental management which principally address the human relationship, dependency and impact on natural

<sup>1</sup> [https://seltmp.eatlas.org.au/sites/default/files/seltmp/articles/SELTMP-GBR\\_Report\\_Nov14\\_0.pdf](https://seltmp.eatlas.org.au/sites/default/files/seltmp/articles/SELTMP-GBR_Report_Nov14_0.pdf)

<sup>2</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>

<sup>3</sup> <https://healthyriverstoreef.org.au/report-card/program-design/>

resources. As described in the report card's Program Design, the three high level drivers in the Mackay-Whitsunday-Isaac Region are climate, population growth and economic growth. The human inputs, pressures, environmental pathways and receptors are depicted in Figure 1, above.

#### **1.4. Terminology**

Alongside assessment of ecosystem health, the report card assesses selected indicators of stewardship, perception and value to report on the overall condition of human dimensions. Due to the nature of assessment required for monitoring and reporting of human dimensions, the calculation and aggregation of standardised scores do not follow the same methods across dimensions. Instead, methods specific to the roll-up of indicators and indices for each dimension is provided in Methods for Mackay-Whitsunday-Isaac 2018 report card document<sup>1</sup>.

Overall, the terminology used in this document for defining the level of aggregation of indicators is, broadly, as follows:

- Overall score is generated by the aggregation of indices or by a single index score;
- Index/indices are generated by the aggregation of indicator categories;
- Indicator categories are generated by one or more related indicators; and
- An indicator is a component of the human dimensions that can be measured or calculated

In the environmental indicators report card, overall scores and scores for indices are represented in the format of a coaster. Presentation of the coasters can be with or without the outer ring (i.e. indicator categories). This is also the case for cultural heritage scores. Varying approaches including the 'speed dial' graphic are used to present effectiveness of agricultural and non-agricultural stewardship practices.

#### **1.5. General scoring of condition assessments**

Ordinal categories are used to describe the scores for condition of indicators, indicator categories and the overall score. This follows a five-point scoring system:

Very Good (A), Good (B), Moderate (C), Poor (D), Very Poor (E).

All indicators have applicable scoring ranges and bandwidths which correspond to the five-point system. Individual scoring ranges are listed below the results tables presented throughout this document.

Results for indicators that had different scoring ranges and bandwidths were translated into a common scoring range before aggregating (rolling up). The common scoring range adopted for reporting is based on that used by the Great Barrier Reef (GBR) report card (Table 1). Once standardised (where necessary), relevant scores were averaged to aggregate into the higher category.

Decision rules were developed for the minimum proportion of information required to generate the rolled-up scores, as follows:

- $\geq 50\%$  of measured indicators to generate the indicator category score (where relevant);
- $\geq 60\%$  of indicator categories to generate an index score; and

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<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>



- Overall scores for reporting zones are presented in the report card, even if not all indicator categories are available.

**Table 1. Overall range of scores.**

Scoring range	Condition grade and colour code
81 to 100	Very Good
61 to <81	Good
41 to <61	Moderate
21 to <41	Poor
0 to <21	Very Poor

### 1.6. Data used in the 2018 report card

Results for human dimension indicators that are reported annually in the 2018 report card are largely based on data collected between July 1<sup>st</sup> 2017 and June 30<sup>th</sup> 2018. This includes:

- Stewardship indicators (agricultural and non-agricultural stewardship);
- Social and Economic indicators; and
- Cultural heritage indicators.

Notably, this data collection period may vary for certain measures of human dimensions. Where this occurs, it is identified within the document. Selected human dimension indicators are reported less frequently than those incorporated in the environmental indicators; however, in the 2018 report card, all human dimension indicators have been updated. Scores will be repeated in future report cards based on the reporting frequency outlined within the Program Design<sup>1</sup>.

<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/program-design/>

## 2. Social and economic results

The Social and Economic Long-Term Monitoring Program (SELTMP) was established in 2011 in an effort to incorporate the human dimension into planning and management of the Great Barrier Reef and its surrounds. As described in CSIRO's report, SELTMP *synthesises existing socio-economic data from a wide range of sources, then fills key knowledge gaps by conducting large-scale surveys of Reef user groups* (Marshall et al. 2014). Selected SELTMP data was employed by the Mackay-Whitsunday-Isaac report card to assess user perceptions of condition, management and value of the GBR and associated waterways, relative to the region.

Further, the approach for reporting on social and economic values in the Mackay-Whitsunday-Isaac report card closely follows that adopted by the Dry Tropics Partnership for Healthy Waters report card (Townsville Region). Where methods do not align, this has been identified in detail within the methods document<sup>1</sup>. Broadly, the key difference in methods for reporting on social values is associated with the grouping of survey questions for the development of index scores. For the Mackay-Whitsunday-Isaac report card, the approach taken was to aggregate social indicators, reflecting regional waterway types as a whole. Three water types were adopted, including freshwater, estuarine/coastal and marine waters. Similar themed indicator categories were grouped to provide an overall index and survey questions were scored by Local Government Area (LGA) as well as at a regional scale. This contrasted the approach taken by the Townsville Dry Tropics Partnership for Healthy Waters, which assessed a number of questions separately based on the corresponding postcodes of respondents, to associate responses with a specific freshwater body, estuary or beach. This meant scores were aggregated across indicator categories to create an index for individual waterways.

The grade for social values is based on the scores of indicators that are grouped into the indices listed below. Indices for social and economic Values may be hereafter referred to in the abbreviated format, as outlined in bracketed text below.

- Perception of waterway condition (condition);
- Perception of waterway management (management);
- Perception of wellbeing derived from the GBR (wellbeing);
- Perception of non-monetary values derived from the GBR (value); and
- Perception of Individual capacity to act (individual capacity)

Whilst the Mackay-Whitsunday-Isaac report card uses the same questions to report on economic values that were used by the Townsville Dry Tropics, a key difference in the approach taken by the Mackay-Whitsunday-Isaac report card is that the indicators are not grouped together into any indicator categories or indices but are used collectively to report on perceived 'economic values'.

The score for economic values score is based on the scores of indicators that are grouped into the following index:

- Perception of economic opportunity delivered by the GBR (economic opportunity).

Results for social values reporting are presented in Table 3 and results for economic values reporting are presented in Table 4. **Error! Reference source not found.**

<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>

Scores for all waterways were generated for the perception of management and condition, via aggregation of freshwater, estuarine and marine scores. The scores for perception of non-monetary value and wellbeing indicators were derived from questions relating directly to the GBR. For these questions, it is acknowledged that the responses are reflective of the entire GBR, rather than any specific water type or waterbody within the reporting zone. The scores for individual capacity were based on survey questions relating directly to the GBR and associated waterways and more generally to sustainable practices within the home and workplace.

Participants were asked to provide a response ranging from 1 – 10, with 1 representing an inclination to very strongly disagree and 10 representing an inclination to very strongly agree with the survey statement. In accordance with the sampling design, survey responses between 1 and 5 represented the inclination to disagree at varying levels and responses between 6 and 10 represented the inclination to agree at varying levels. No response was treated as neutral.

The distribution of responses for each survey question were assessed for normality. Whilst the responses to some survey questions were normally distributed, most were positively skewed to some degree. For the purpose of this assessment, the A-E scoring range has been shifted upwards for all indicator categories so that a higher mean score is required to achieve a very good score. This approach was adopted based on the distribution of responses and to elicit sensitivity for detecting change in social and economic perceptions over time, whereby a smaller shift in the annual mean is required to translate to a shift in grading.

In contrast to the environmental condition assessments, a grading of “C” does not necessarily indicate passing or failing a guideline. Instead, it indicates that the community derives moderate wellbeing from the GBR.

Further details regarding the method for grading social and economic value is provided in Section 2.1 of the methods document<sup>1</sup>.

**Table 2. Percentage of population surveyed within the Mackay and Whitsunday Region. NB Isaac was not included due to the limited number (four) of responses received from the Isaac LGA.**

Zone	Population	Population Surveyed	Percentage (%) of the population surveyed
Mackay Regional Council	116,539	113	0.0009
Whitsunday Regional Council	22,501	170	0.007
Total	139,040	283	0.002

<sup>1</sup><https://healthyriverstoreef.org.au/report-card/report-card-download/>

**Table 3. Regional and local government area (WRC Whitsunday Regional Council and MRC Mackay Regional Council) scores for the indicator categories and indices that comprise the social values score for the 2018 Report Card (2017 SELTMP data). For the WRC, respondents comprised 0.007% of the total population. For the MRC, respondents comprised 0.0009% of the total population. Standard errors (SE) and sample size denoted as *n* are presented, in order to convey the level of variance in views surveyed. The asterisk (\*) identifies that a score is calculated from the average of the indices ‘all waterways perception of condition’, ‘all waterways perception of management’, ‘values of GBR’, ‘wellbeing from GBR’.**

Location	Perception of condition				Perception of management			Perception of GBR Values	Perception of Wellbeing from GBR	Perception of Individual capacity
	Freshwater	Estuary and beaches	Marine and Reef	All waterways	Freshwater	Marine and Reef	All waterways			
Region average	4.2	5.4	5.1	4.9	5.8	6.2	6.0	7.7	7.4	6.9
<i>n</i>	256	259	260	258	260	268	264	265	270	271
SE	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1
WRC average	4.3	5.4	4.8	4.8	5.8	6.2	6.0	7.8	7.5	7.0
<i>n</i>	155	157	159	157	158	162	160	160	163	164
SE	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MRC average	3.9	5.4	5.4	4.9	5.8	6.3	6.1	7.6	7.2	6.8
<i>n</i>	101	102	101	101	101	106	104	104	107	107
SE	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2

Scoring range (excluding Individual Capacity): ■ (E): 0 to <5 | ■ (D): 5 to <6 | ■ (C): 6 to <7 | ■ (B): 7 to <8 | ■ (A): 8 to 10 | ■ No score/data gap

Scoring range for Individual Capacity: ■ (E): <6 | ■ (D): 6 to <7 | ■ (C): 7 to <8 | ■ (B): 8 to <9 | ■ (A): 9 to 10 | ■ No score/data gap

**Table 4. Regional and local government area (WRC Whitsunday Regional Council and MRC Mackay Regional Council) scores for the indicators and index that comprises the economic values score for the 2018 Report Card (2017 SELTMP data). Standard errors SE and sample size n are presented.**

Location	Opportunities to attract visitors	Opportunities for scientific discoveries	Fresh local seafood	Perceived Economic value	Perceived Economic Opportunities
Region average	8.8	8.4	7.5	9.4	8.5
<i>n</i>	269	266	268	276	269
SE	0.1	0.1	0.2	0.1	0.1
WRC average	8.8	8.5	7.1	9.5	8.5
<i>n</i>	164	160	164	165	163
SE	0.2	0.2	0.2	0.1	0.2
MRC average	8.8	8.3	8.0	9.2	8.6
<i>n</i>	105	106	104	111	106
SE	0.2	0.2	0.2	0.2	0.2

Scoring range (excluding Individual Capacity): ■ (E): 0 to <5 | ■ (D): 5 to <6 | ■ (C): 6 to <7 | ■ (B): 7 to <8 | ■ (A): 8 to 10 | ■ No score/data gap

### 2.1.1. Social

A total of 283 people across the Mackay-Whitsunday-Isaac Region participated in the survey, from a total population of approximately 139, 040 (Table 2). The results for the 2018 report card indicated that the community derived good value and wellbeing from the GBR, but perceived condition and management of the GBR and its associated waterways to be very poor to moderate, respectively. Overall, the community graded their individual capacity to act in order to effect positive environmental change poorly.

Within the Mackay Regional Council (MRC), respondents rated the condition of estuarine and beach water types equally to that of marine and reef water types, both grading as poor. In contrast, residents within the Whitsunday Regional Council (WRC) perceived condition of marine and reef water types to be poorer than estuarine and beach water types, grading very poor and poor respectively. This could reflect sentiments relating to the impacts associated with Tropical Cyclone Debbie, which physically degraded the inner reefs of the Whitsunday region in 2017 (Australian Institute of Marine Science, 2019), however, further assessment and future report cards would be needed to delineate this observation. Overall, the perception of condition and management was poorer for freshwater than any other water type, ranging from very poor to poor respectively, irrespective of the surveyed LGA.

The community's perception of waterway management, non-monetary value and wellbeing derived from the GBR was consistent across both LGAs. Despite the broad consistency in indicator category gradings between LGAs, residents within the WRC graded their individual capacity to act slightly higher than residents within the MRC.

### 2.1.2. Economic

Respondents had very positive perceptions of the economic opportunity delivered by the GBR across the four indicators which were assessed (A to B grading). Notably, perceived economic value was >9

within the MRC and WRC, despite the prevailing perception of poor to moderate condition and management of local marine water types. The indicator ‘fresh local seafood’ was the only economic opportunity indicator which graded below very good. Based on the survey question, “I value the GBR for the fresh seafood it provides”, it is unclear whether respondents were less inclined to agree that this statement aligned with their values, or, whether they did not perceive the GBR delivered fresh local seafood.

Notably, assessment of social values incorporated multiple water types whereas assessment of perception of economic opportunity was derived from survey questions focal to the GBR. This limitation should be considered in the interpretation of regional perceptions of economic opportunity which do not capture, for example, the potential of freshwater systems as an economic asset or their potential to provide food resources (commercial or recreational fishing).

## **2.2. Confidence**

There is currently no method to score confidence for social and economic indices, therefore, the standard error and number of survey respondents (n) are presented with the results. The standard error was calculated for each question and then averaged for each indicator category. In the absence of a measure of accuracy for the methodology and, therefore, the results; the standard error represents the variability in survey responses. The percentage of the population surveyed was calculated based on the number of survey respondents and the number of people living within the overall reporting zone and the LGA. The population within each LGA was based on 2016 Census data (Australian Bureau of Statistics, 2016). The population, number of survey respondents within the population and calculated proportion of population surveyed are included in Table 2.

Based on the proportion of population surveyed, the sample size was relatively small, therefore, reducing the representativeness of survey results. For example, 113 Mackay residents participated in the survey, out of a total population of 116,539 (based on 2016 Census data, Australian Bureau of Statistics). Increasing survey sizes will improve the accuracy of the data and representativeness of the results. This limitation should be acknowledged and taken into account when interpreting the results.

Developing a suitable method for evaluating confidence in social and economic indicators is a key objective for the Partnership.

### **2.2.1. Social and Economic Recommendations**

A number of recommendations were provided by the Independent Science Panel (ISP) upon review of the draft methods and results for social and economic assessment. Namely, these included recommendations to increase the sample size and rigor of the assessment, where practicable, to better evaluate community sentiments. It was suggested this could be achieved by drawing on additional SELTMP questions, where relevant, employing other lines of evidence to inform or validate scores and, or, establishing a weighting for the importance of different questions which would then be used to weight questions in the development of scores and grades. Improvements may also be achieved by drawing on advances made through the Reef Integrated Monitoring, Modelling and Reporting Program (RIMMReP), however this is highly dependent on the timing and outcomes realised



through this initiative. These options are currently under review by the Partnership and Technical Working Group.

### 3. Agricultural stewardship

Stewardship is defined as ‘actions taken by individuals, groups or networks, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts’. Agricultural stewardship assessments used in the Mackay-Whitsunday-Isaac report cards are a measure of land (% ha) under Best Management Practice (BMP), where BMP is defined as activity expected to result in a Low or Moderate-Low risk to water quality. The risk levels described for each practice, where relevant, are described in Table 5, Section 2.2.3, of the methods report<sup>1</sup>.

The Mackay-Whitsunday-Isaac report card aligns its agricultural stewardship reporting with the GBR report card, which is reported on through the Paddock to Reef program<sup>2</sup>. For the 2018 report card, management practice adoption benchmarks were revised for each agricultural industry practice. The 2016-17 year was set as the benchmark year from which to show improvements (Australian and Queensland Governments 2019). Previously reported agricultural stewardship results for sugarcane, grazing and horticulture for the 2014, 2015 and 2016 report cards are reported on a different benchmark scale, and therefore cannot be compared to 2018 agricultural stewardship results. For further information relating to methods for agricultural stewardship, refer to Section 2.2.3 of ‘Methods for the Mackay-Whitsunday-Isaac Report Card 2018 Human Dimension Indicators’<sup>3</sup> and the Great Barrier Reef report card 2017 and 2018<sup>4</sup>.

#### 3.1.1. Sugarcane

The stewardship results for the sugarcane industry for the 2018 report card are from the Proserpine, O’Connell, Pioneer and Plane basins only (the Don basin was not included due to a limited sugarcane industry in this reporting area). Land (% ha) under best management practice for pesticides, nutrients and soil were set against revised management practice benchmarks, aligning with GBR sugarcane agricultural stewardship reporting.

For the 2018 report card, approximately 6.0% of sugarcane farming land was being managed using best practice management for practices relating to pesticides, 7.1% for nutrients and 2.3% for soil (Table 5; Figure 2).

Two programs reported data for the 2017-18 reporting year, the Australian Government funded Reef Trust III program, and the Queensland Government funded Department of Agriculture and Fisheries (DAF) Sugarcane extension program.

There was an increase in the area managed using best management practices for nutrient management by 0.1%. This was driven by an area of 178 ha in the Pioneer catchment which adopted

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<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>

<sup>2</sup> <https://www.reefplan.qld.gov.au/tracking-progress/paddock-to-reef>

<sup>3</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>

<sup>4</sup> <https://www.reefplan.qld.gov.au/tracking-progress/reef-report-card>

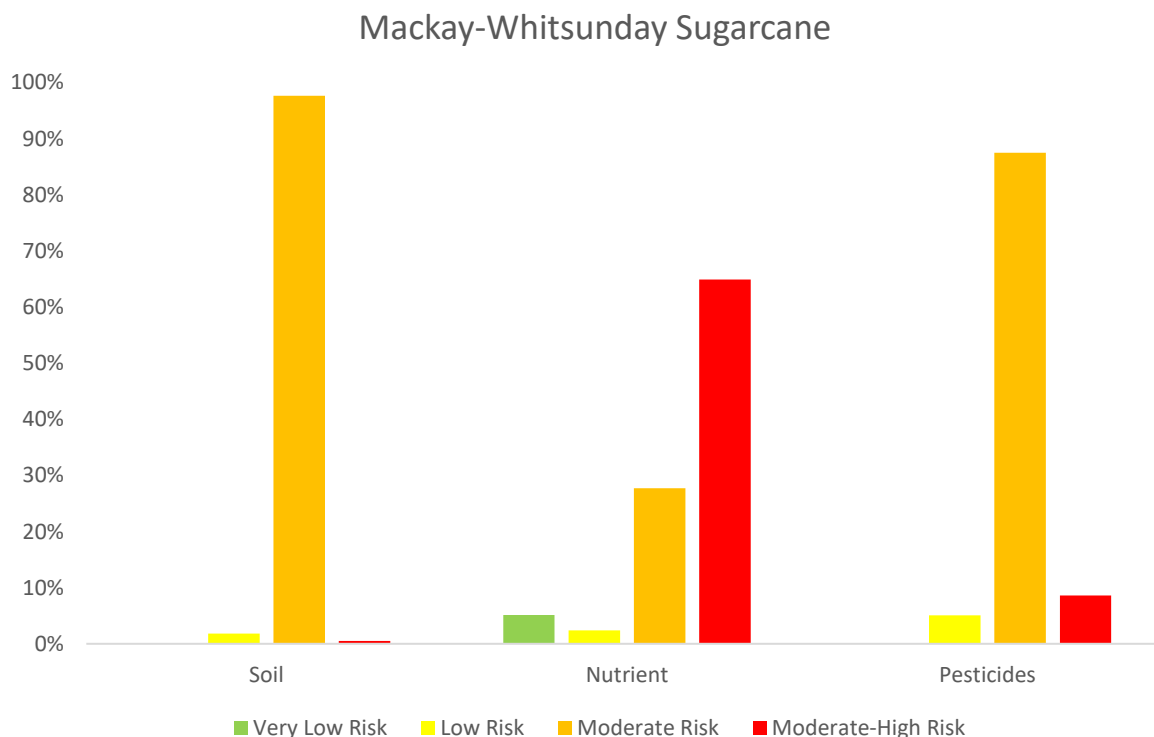
best management practice of Nitrogen surplus. In addition, 711 ha in the Plane Creek catchment, 292 ha in the Pioneer Catchment and 729ha in the O’Connell River catchment also improved their management of Nitrogen surplus.

There was an increase of 0.9% in area managed using best management practices for pesticide management. This was as a result of 643 ha in the Plane creek catchment adopting the practice of band spraying residual pesticides and 390 ha in the Plane creek catchment reducing their application of residual pesticides in ratoon cane.

No increase to soil management occurred from the 2016 benchmark to the 2017-18 reporting year for sugarcane (Table 5).

**Table 5. Sugarcane area managed under best management practice systems (%) for the 2018 report card. Benchmark reporting in the Mackay-Whitsunday-Isaac report card aligns with the GBR report card, where the benchmark was set from 2016.**

Management area	2016 Benchmark	Sugarcane under best practice (%) for 2017-18 reporting year
Soil	2.3%	2.3%
Nutrients	7.0%	7.1%
Pesticides	5.1%	6.0%



**Figure 2. Proportional (%) area of sugarcane water quality risk (very low-high risk) for soil, nutrients and pesticides for the 2018 report card.**

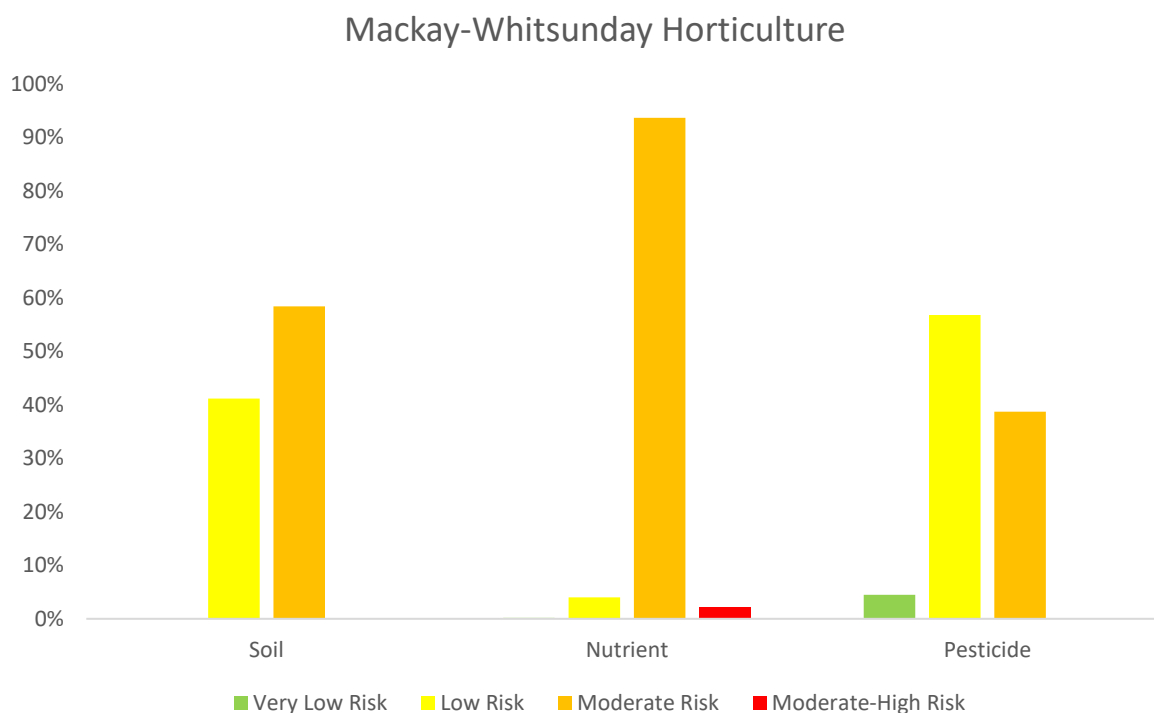
### 3.1.2. Horticulture

The stewardship results for the horticulture industry for the 2018 report card include data from the Don basin only, due to a limited horticulture industry across the other basins in the region. Land (% ha) under best management practice for pesticides, nutrients and soil were set against revised management benchmarks, aligning with GBR horticulture agricultural stewardship reporting.

For the 2018 report card, approximately 41.2% of horticulture land was being managed by best management practice for soil, 4.2% for nutrients and 61.3% for pesticides (Figure 3). There was no reported increase in the area managed under best practice for soil or pesticide management, whilst there was a 0.6% increase in area managed using best practice for nutrients (Table 6).

**Table 6. Horticulture area managed under best management practice systems (%) for the 2018 report card. Benchmark reporting in the Mackay-Whitsunday-Isaac report card aligns with the GBR report card, where the benchmark was set from 2016.**

Management area	2016 Benchmark	Horticulture under best practice (%) for 2017-18 reporting year
Soil	41.2%	41.2%
Nutrients	3.6%	4.2%
Pesticides	61.3%	61.3%



**Figure 3. Proportional (%) area of horticulture water quality risk (very low-very high) for soil, pesticides, nutrients and irrigation for the 2018 report card.**

### 3.1.3. Grazing

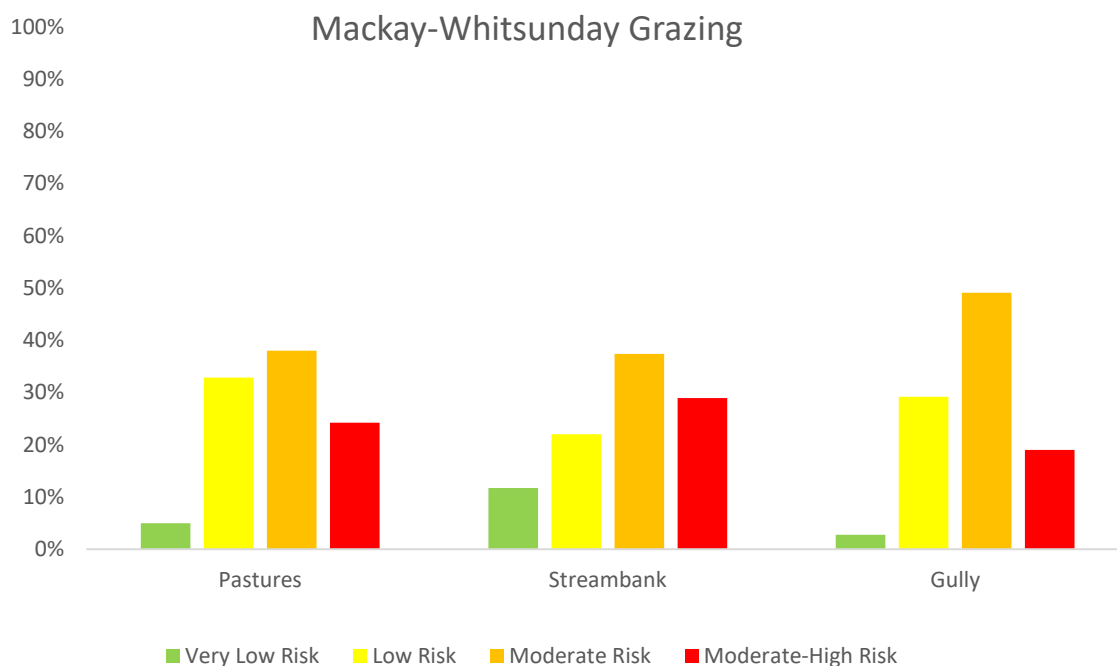
The management practice levels within the grazing industry address the three main erosion pathways (pastures (hillslope), streambanks and gullies) across the five basins in the Region. Results for grazing are reported slightly different when compared to the GBR report card as the Mackay-Whitsunday-Isaac report card includes the Don basin for reporting grazing stewardship.

For the 2018 report card, approximately 37.9% of grazing land was being managed using best management practice systems for practices related to pasture (hillslope) erosion, 33.7% for practices relating to streambank erosion and 31.9% for practices relating to gully erosion (Table 7; Figure 4).

In the 2017-18 reporting year, there was an increase of 1.8% in the area managed using best practice for pasture management. There was no increase in the area of gullies or streambanks managed using best practice (Table 7).

**Table 7. Grazing under best management practice systems (%) for the 2018 report card. Benchmark reporting in the Mackay-Whitsunday-Isaac report card aligns with the GBR report card, where the benchmark was set from 2016.**

Management area	2016 Benchmark	Grazing under best practice (%) for 2017-18 reporting year
Pastures	36.1%	37.9%
Streambanks	33.7%	33.7%
Gullies	31.9%	31.9%



**Figure 4. Proportional (%) area of grazing water quality risk (very low-very high) for pastures, streambanks and gullies for the 2018 report card.**

### 3.2. Confidence

The report card scores were rated in terms of the confidence and uncertainty surrounding the methods of assessment and data used in the development of each score. To achieve this, five criteria relating to data confidence are assessed for each indicator in each reporting area, including maturity of methodology, validation, representativeness, directness, and measure error. This information is used to provide a qualitative assessment of confidence for all grades generated in the report card.

For indicators where a condition score was reported, each criterion is scored 1 (lowest) to 3 (highest). Confidence associated with agricultural stewardship scores are defined in Table 8.

A detailed summary of confidence methods and scoring are provided in Section 2.4.2 of the methods report<sup>1</sup>.

**Table 8. Confidence associated with non-agricultural stewardship results in the Mackay-Whitsunday-Isaac 2018 report card. Confidence criteria are score 1-3 and then weighted by the value identified in parenthesis. Final scores (4.5-13.5) are additive across weighted confidence criteria. Final scores correspond to a rank from 1-5 (very low- very high), which indicates final confidence level.**

Indicator category	Maturity of methodology (x0.36)	Validation (x0.71)	Representativeness (x2)	Directness (x0.71)	Measured error (x0.71)	Final	Rank
Horticulture	1	2	2	2	1	7.9	2
Grazing	1	2	2	2	1	7.9	2
Sugar cane	1	2	2	2	1	7.9	2
agricultural stewardship						7.9	2

### 3.3. Non-agricultural stewardship

To assess environmental stewardship, key industries within the GBR region were identified. In the Mackay-Whitsunday-Isaac Region, these principally include heavy industry, ports, urban, tourism and aquaculture. Key stakeholders and representatives from each sector are invited to complete a confidential survey assessing the environmental management practices undertaken by their organisation. Survey respondents are asked to provide any relevant supporting information.

The responses provided were assessed and scored in accordance with the stewardship frameworks developed for each respective industry, by an independent consultant (Eco Logical Australia 2019). To increase the rigor of the assessment process, supplementary sources of information were also used to evaluate environmental stewardship including annual reports and those prepared by regulatory agencies, which are publically available (Eco Logical Australia and Adaptive Strategies 2015).

Stewardship scores were generated for different activities across three principal management themes; planning, implementation and outcome, in accordance with the relevant industry framework method. The lowest of the three management theme scores was adopted to represent the overall

<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>

Stewardship rating for the sector. Final stewardship scores were assessed on a scale comprising four levels: Very Effective, Effective, Partially Effective and Ineffective.

A detailed summary of the methods for non-agricultural stewardship assessment are described in Section 2.2.4 and 2.2.5 of the methods report<sup>1</sup>.

### 3.3.1. Heavy industry

The Mackay-Whitsunday-Isaac Region has a large diversity of heavy industry activities, including coal export terminals, sugar mills, meat processing facilities and storage areas for commodities such as mineral sands, petroleum products and grain. These industries are highly regulated and have environmental management practices in place to protect ecosystem health and water quality.

The stewardship results were generated from four companies across the sugar milling, meat processing and coal handling industries. Compliance data from the Queensland Department of Environment and Science (DES) and a range of relevant studies and publications were also utilised, including annual reports of companies and industry bodies. A response rate of 57% was achieved from the companies and agencies invited to provide information to inform the assessment.

The overall result for heavy industry stewardship in the Mackay-Whitsunday-Isaac Region was effective for the 2017-18 reporting period (Figure 5Table 9). This was similar to the 2016, 2015 and 2014 report cards.

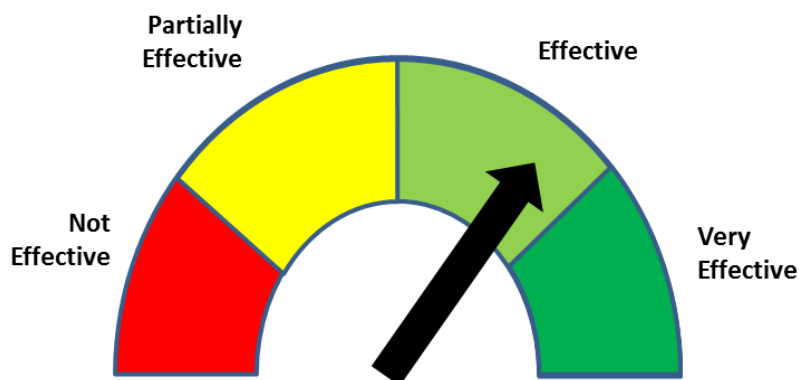


Figure 5. Speed dial representation of effectiveness for Heavy Industry stewardship practices in the 2017-2018 reporting period.

The development activity group scored was the only group to score very effective, as described in Table 9 below.

<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>



**Table 9. Scoring matrix for activity groups across planning, implementation and outcome management themes within heavy industry, for the 2017-2018 reporting period.**

Activity group	Management theme		
	Planning	Implementation	Outcome
Administration	3.3 (effective)	3.6 (effective)	3.5 (effective)
Operations	3.8 (very effective)	3.4 (effective)	3.8 (very effective)
Development	4.0 (very effective)	4.0 (very effective)	4.0 (very effective)
<b>Grand Total</b>	<b>3.7 (effective)</b>	<b>3.6 (effective)</b>	<b>3.7 (effective)</b>

Scale: >3.75 very effective, 3.00 – 3.75 effective, 2.00 – 2.99 partially effective, <2.00 – ineffective

A number of strengths and innovation elements were highlighted in the heavy industry sector for the 2018 report card;

- A key element in achieving the effective rating was the extra non-regulatory activities that companies undertake to deliver positive environmental outcomes;
- Environmental management staff have a high awareness of environmental regulations and their responsibilities to implement management systems to reduce environmental impacts;
- Innovation and a commitment to reduce and reuse waste products are evident, particularly in the sugar and meat processing industries. These practices demonstrate successful approaches to managing threats to the Great Barrier Reef from nutrients and climate change in a commercially viable manner. Examples of this include:
  - Treated effluent to irrigate a turf farm; and
  - Use of cane waste to produce electricity and ethanol for addition to fuel.
- Heavy industry terminal operators contribute to a range of environmental programs, working in partnership with the port authority.

Areas for improvement identified in the 2018 report card included;

- Heavy industry companies were assessed by DES for compliance on 30 occasions, using a mix of desktop and inspection methods. Three instances of non-compliance were detected, which were the result of a wastewater and sewage release to the environment. This resulted in a compliance rate of 90%;
- The level of participation in research and extension activities related to ecosystem health varied among companies; and
- There was high variability in response from companies on community engagement activities. Some companies undertake extensive consultation programs, while others are limited/don't have any.

### 3.3.2. Ports

A single port authority North Queensland Bulk Ports Corporation Limited (NQBP) operates the Ports of Abbot Point, Mackay and Hay Point within the Mackay-Whitsunday-Isaac Region and is a highly regulated industry. The region's ports account for approximately 50% of Queensland's total export sea trade. There is a high level of community engagement on environmental issues, with significant contributions towards environmental initiatives from port bodies.

The overall result for Ports stewardship in the Mackay-Whitsunday-Isaac Region was very effective for the 2017-18 reporting period (Figure 6).

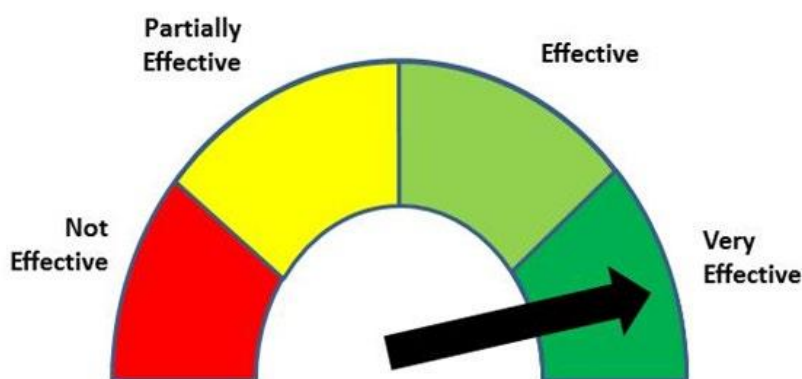


Figure 6. Speed dial representation of effectiveness for Ports stewardship practices in the 2017-2018 reporting period.

This was consistent across all management themes and activity groups. Eleven of the 12 stewardship scores were in the very effective range, with shipping implementation assessed as effective (Table 10). There was no capital or maintenance dredging activity during the reporting period.

Table 10. Scoring matrix for activity groups across planning, implementation and outcome management themes within Ports operations, for the 2017-2018 reporting period.

Activity group	Management theme		
	Planning	Implementation	Outcome
Administration	3.8 (very effective)	4.0 (very effective)	4.0 (very effective)
Operations	4.0 (very effective)	4.0 (very effective)	4.0 (very effective)
Development	4.0 (very effective)	4.0 (very effective)	4.0 (very effective)
Shipping	3.8 (very effective)	3.5 (effective)	4.0 (very effective)
<b>Grand Total</b>	<b>3.9 (very effective)</b>	<b>3.9 (very effective)</b>	<b>4.0 (very effective)</b>

Scale: >3.75 very effective, 3.00 – 3.75 effective, 2.00 – 2.99 partially effective, <2.00 – ineffective

A number of strengths and innovation elements were highlighted in the ports industry for the 2018 report card;

- The port authority employs highly qualified and experienced staff to manage ecosystem health and water quality;
- The port authority is extensively involved in environmental extension and research programs in the region;
- The port authority and James Cook University (JCU) during the reporting period, announced a new internship program, which gives two students the opportunity to spend four weeks in the field and at North Queensland Bulk Ports, gaining invaluable real-world experience in marine port science;
- The port industry is leading the industry with the Port of Hay Point Sustainable Sediment Assessment. The study investigates options to manage sedimentation through predictive

models and to reuse dredged material for beneficial purposes. This initiative is an example of leading environmental practices undertaken at the port;

- There is a high level of community engagement by the port authority on environmental issues, with significant contributions to the environmental initiatives of port industry; and
- Ambient marine monitoring programs for seagrass, water quality and inshore rocky reefs are in place for extended areas around the three ports. The results of the monitoring assist in providing a comprehensive baseline for references during future dredging programs. These programs are above and beyond what is required for regulation. Additionally, results are provided to the Mackay-Whitsunday-Isaac Healthy Rivers to Reef Partnership as an in-kind contribution, with data informing the development of the annual report card.

Areas for improvement highlighted from the Eco Logical 2018 surveys for the 2018 report card included;

- The stewardship framework relies heavily (although not entirely) on compliance with the existing regulatory framework. This assumes that the legislation and regulatory processes themselves are adequate to provide good environmental outcomes i.e. that the regulatory framework is effective. Although the regulators are including environmental stewardship categories in the Reef 2050 program, there is currently no regulatory stewardship framework.

### **3.3.3. Urban**

Urban development within the Mackay-Whitsunday-Isaac Region is concentrated along the coastal zone. Urban land uses occur predominantly within cities such as Mackay and large regional centres. Several small towns are also located inland and along the coast.

The stewardship results were generated from a range of information sources, including surveys completed by companies involved in urban development, commercial airport facilities, local governments, compliance data from DES and a range of relevant studies and publications (e.g. Council's annual reports). A response rate of 80% was achieved from the companies and agencies invited to provide information to inform the assessment.

The overall result for urban stewardship in the Mackay-Whitsunday-Isaac Region was effective for the 2017-18 reporting year (Figure 7). This was consistent across the planning, implementation and outcome management themes.

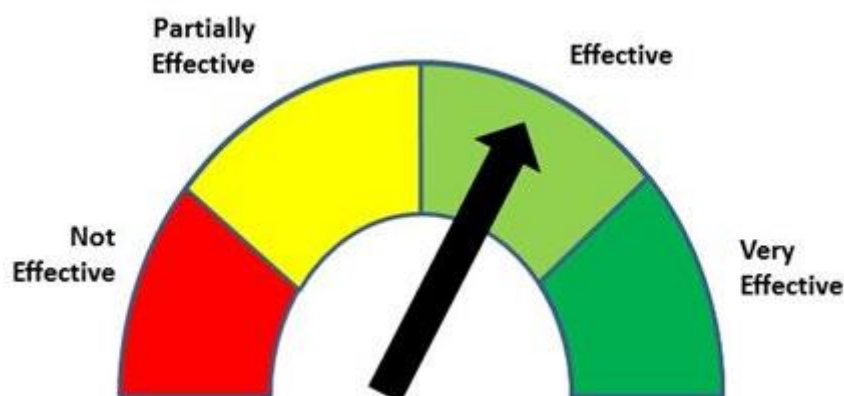


Figure 7. Speed dial representation of effectiveness for Urban Development stewardship practices in the 2017-2018 reporting period.

The operations and development activity groups scored effective to highly effective, with administration assessed as partially effective overall (Table 11).

Table 11. Scoring matrix for activity groups across planning, implementation and outcome management themes within Urban Development operations, for the 2017-2018 reporting period.

Activity group	Management theme		
	Planning	Implementation	Outcome
Administration	3.2 (effective)	3.0 (effective)	3.0 (partially effective)
Operations	3.3 (effective)	4.0 (very effective)	3.5 (effective)
Development	3.5 (effective)	3.8 (very effective)	3.5 (effective)
<b>Grand Total</b>	<b>3.3 (effective)</b>	<b>3.6 (effective)</b>	<b>3.3 (effective)</b>

Scale: >3.75 very effective, 3.00 – 3.75 effective, 2.00 – 2.99 partially effective, <2.00 – ineffective

A number of strengths and innovation elements were highlighted in the urban stewardship for the 2018 report card;

- Mackay and Whitsunday Regional Councils are long-term partners of the Reef Guardian Program, which showcases environmentally sustainable practices in the Great Barrier Reef catchment. This level of participation reflects a long-term commitment to protect and conserve the health and resilience of the Reef;
- There was a high degree of awareness within companies and Councils of environmental management practices related to the improvement of water quality and Reef health. Typical investments included restoring and reconnective coastal ecosystems, improving water quality by upgrading wastewater treatment plants, improving stormwater management, and reducing threats of chemicals and other pollutants;
- There was a high degree of community engagement in environmental practices affecting urban environments. Commitment to these programs was generally long-term and resulted in successful outcomes.; and
- A compliance rate of 96% was achieved from 140 desktop audits and inspections of urban sites by DES officers. This compliance rate is in the very effective range. Non-compliances were

most commonly related to a breach of approval conditions and resulted in a warning. One enforcement measure and one statutory measure were issued for a breach of an Environmental Protection Order.

Areas for improvement highlighted in Eco Logical 2018 surveys in urban stewardship for the 2018 report card included;

- The level of commitment to and investment in environmental management practices varied among stakeholders, however is largely driven by legislation;
- Wider collaboration in the development of urban stewardship frameworks across all levels of government is recommended to increase uptake and implementation of region-specific initiatives;
- Greater participation in the stewardship questionnaire from stakeholders will increase sample size and provide a more robust data set from which to form an assessment; and
- Local government compliance programs were often not strategic or risk-based and could be improved to monitor the effectiveness of controls on development activities in the Great Barrier Reef catchment.

### 3.3.4. Tourism

The Mackay-Whitsunday-Isaac Region is a hub for tourism operations, with approximately 45% of tourists visiting the Great Barrier Reef participating in activities in the region. The commercial marine tourism industry of the region is comprised of a number of operations and activities, including reef cruises and boat tours, organised diving and snorkelling, boat charters, air charters and water-based sports. The industry is closely regulated, primarily in relation to access and operations within the Great Barrier Reef Marine Park and National Park islands.

The stewardship results were generated from survey responses of 6 tour companies, liaison with industry representative bodies, information provided by Ecotourism Australia and a range of relevant studies and publications.

The overall result for tourism stewardship in the Mackay-Whitsunday-Isaac Region was effective for the 2017-18 reporting period (Figure 8). This reflects the strong links of tourism operators and representative bodies with regulatory agencies and high levels of third-party accreditation obtained by operators.

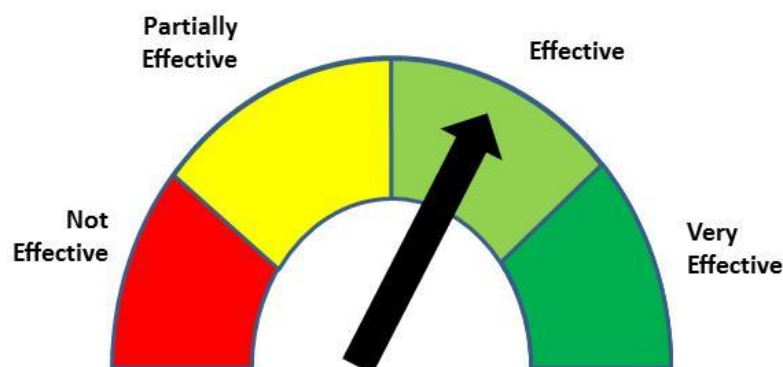


Figure 8. Speed dial representation of effectiveness for Tourism stewardship practices in the 2017-2018 reporting period.

All management theme scores by activity group are provided in Table 12.

**Table 12. Scoring matrix for activity groups across planning, implementation and outcome management themes within Tourism operations, for the 2017-2018 reporting period.**

Activity group	Management theme		
	Planning	Implementation	Outcome
Administration	3.2 (effective)	3.8 (very effective)	3.3 (effective)
Operations	3.5 (effective)	3.2 (effective)	3.4 (effective)
Development	3.3 (effective)	3.5 (effective)	3.3 (effective)
<b>Grand Total</b>	<b>3.3 (effective)</b>	<b>3.5 (effective)</b>	<b>3.4 (effective)</b>

Scale: >3.75 very effective, 3.00 – 3.75 effective, 2.00 – 2.99 partially effective, <2.00 – ineffective

A number of strengths and innovation elements were highlighted in tourism for the 2018 report card;

- There is high participation in recognised environmental industry accreditation programs:
  - In the region, 37 tourism operators participate in the ECO (Eco Tourism) Certification program. For certification, operators must demonstrate a strong, well-managed commitment to sustainable practice. Of certified operators, 14 held Advanced Ecotourism certification; and
  - There is a high (>90%) participation in industry associations with codes of practice and auditing.
- Participation in extension and research projects is moderate to high, particularly ‘Eye on the Reef’, ‘Reef Guardian’ and crown-of-thorns starfish control programs. These programs are associated with reporting the condition of ecosystem values on the Great Barrier Reef and taking voluntary actions to improve environmental outcomes, beyond what is required by regulation;
- The GBRMPA permit compliance system of marine park permits is comprehensive and compliance rates are very high. This information indicated that any permit non-compliance for the tourism sector was largely administrative, such as failing to display a mooring reference number;
- Information available from the GBRMBA 2017-18 annual report indicated few environmental incidences or serious non-compliance matters were reported;
- On average, each tourism operator is estimated to spend \$55,000 per annum in environmental extension and research programs (including in-kind investments); and
- Training programs for tourism are available through local TAFE and applied within the industry.

Areas for improvement highlighted in Eco Logical 2018 surveys in tourism for the 2018 report card included;

- Information on the number of audits/inspections undertaken on GBRMPA tourism permit holders was not available from the GBRMPA 2017-18 annual report. There were 420 actions taken to resolve permit non-compliance issues across all industries. It is not known what proportion of these are assigned to the tourism industry in the Mackay-Whitsunday-Isaac Region
- Greater participation in the stewardship questionnaire from stakeholders will increase



sample size and provide a more robust data set from which to form an assessment

- The GBRMPA permit system was not able to supply regionally-specific compliance data or information on the level of participation of tourism operators in stewardship programs. Such information would enhance the rigor and application of the framework

### 3.3.5. Aquaculture

The aquaculture industry in the Mackay-Whitsunday-Isaac Region is comprised of a small number of prawn, barramundi and red-claw crayfish farms. The industry is highly regulated, primarily in relation to wastewater discharges and the management of biosecurity issues such as disease. The stewardship results were generated from three companies and liaison with three representative bodies in the prawn and barramundi farming industries. Compliance data from the DAF, DES and a range of relevant studies and publications were also utilised (e.g. research from CSIRO and publications from industry representative bodies). A response rate of 75% was achieved from the companies and agencies invited to provide information to inform the assessment.

The overall result for aquaculture stewardship in the Mackay-Whitsunday-Isaac Region was very effective for the 2017-18 reporting year (Figure 9).

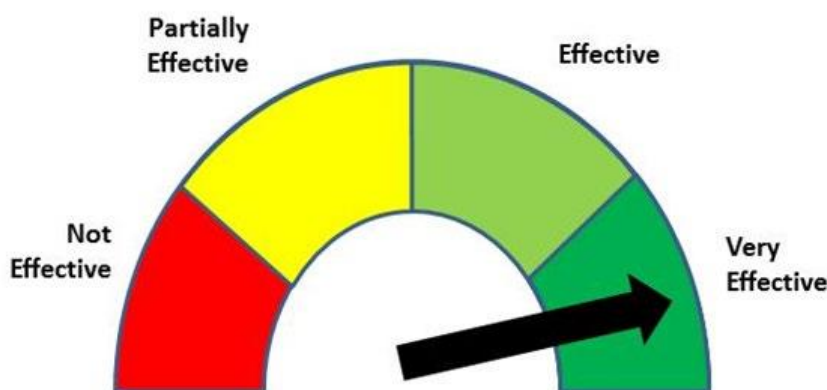


Figure 9. Speed dial representation of effectiveness for Aquaculture stewardship practices in the 2017-2018 reporting period

Very effective scores were consistent across the administration, development and operations activity groups, with seven of the nine scores in this range (Table 13). The stewardship activities of the aquaculture industry were assessed to be above and beyond those of comparable industries where discharges to the environment occur.

**Table 13. Scoring matrix for activity groups across planning, implementation and outcome management themes within Aquaculture operations, for the 2017-2018 reporting period.**

Activity group	Management theme		
	Planning	Implementation	Outcome
Administration	3.6 (effective)	3.8 (very effective)	3.7 (effective)
Operations	3.8 (very effective)	4.0 (very effective)	4.0 (very effective)
Development	4.0 (very effective)	4.0 (very effective)	3.8 (very effective)
<b>Grand Total</b>	<b>3.8 (very effective)</b>	<b>3.9 (very effective)</b>	<b>3.8 (very effective)</b>

Scale: >3.75 very effective, 3.00 – 3.75 effective, 2.00 – 2.99 partially effective, <2.00 – ineffective

A number of strengths and innovation elements were highlighted in aquaculture for the 2018 report card;

- The prawn and barramundi farming industries continue to work closely with research institutes (CSIRO and James Cook University) to develop more efficient farming practices, feed inputs and wastewater (nutrient removal) treatment;
- The water quality initiatives implemented by the aquaculture industry in the region align with the water quality objectives of the joint Commonwealth and State Governments Reef 2050 Water Quality Improvement Plan;
- Queensland Boating and Fisheries Patrol (QBFP) completed 12 compliance inspections of aquaculture facilities in the region to check adherence with farm approval conditions. A compliance rate of 100% was achieved; and
- Regulatory requirements for new or expanded developments involve a nil net discharge of nutrients. This requirement is above and beyond that of comparable industries (e.g agriculture) or land uses (e.g urban) in the region.

Areas for improvement highlighted in Eco Logical 2018 surveys in aquaculture for the 2018 report card included;

- The stewardship framework relies heavily (although not entirely) on compliance with the existing regulatory framework. This assumes that the legislation and regulatory processes themselves are adequate to provide good environmental outcomes i.e. that the regulatory framework is effective. There is currently no regulatory stewardship framework.

### 3.3.6. Confidence

Confidence scores associated with non-agricultural stewardship scores for 2018 are provided in Table 14 below, however, some limitations should be noted. For example, the stewardship assessment relies heavily on self-assessment through questionnaires which, although repeatable and consistent in nature for application across different organisations and years, may not capture all relevant improvements in environmental management processes. Based on advances in the urban stewardship framework progressed through the Queensland Reef Water Quality Program, led by the Office of the Great Barrier Reef (OGBR), the decision was made to review the current non-agricultural stewardship

methods for assessment across the remaining industries. More information is provided in Section 2.2.4 of the methods report<sup>1</sup>.

**Table 14. Confidence associated with non-agricultural stewardship results in the Mackay-Whitsunday-Isaac 2018 report card. Confidence criteria are score 1-3 and then weighted by the value identified in parenthesis. Final scores (4.5-13.5) are additive across weighted confidence criteria. Final scores correspond to a rank from 1-5 (very low- very high), which indicates final confidence level.**

Indicator category	Maturity of methodology (x0.36)	Validation (x0.71)	Representativeness (x2)	Directness (x0.71)	Measured error (x0.71)	Final	Rank
Ports	1	2	3	1	1	9.2	3
Tourism	1	2	3	1	1	9.2	3
Urban	1	2	3	1	1	9.2	3
Heavy industry	1	2	3	1	1	9.2	3
Aquaculture	1	2	3	1	1	9.2	3
Non-agricultural stewardship						9.2	3

## 4. Cultural heritage

The cultural heritage indicators assessed for the Mackay-Whitsunday-Isaac 2018 report card were conducted in collaboration with the Traditional Owner Reference Group (TORG) who represent the Yuwibara, Koinjmal/Koinmerburra, Barada/Widi and Ngaro/Gia/Juru Traditional Owners of the Mackay-Whitsunday-Isaac Region, alongside engaged consultant Markwell and Associates. The TORG represent a unique model across the Great Barrier Reef as they comprise representatives from each of the seven fresh and saltwater Traditional Owner groups within the Mackay-Whitsunday-Isaac Region, are specifically focussed on promoting and supporting caring for country, and, although not a formal organisation, have well developed structures, a strategic plan, and are a cohesive group of Traditional Owners who have passionately been supporting caring for country outcomes with their partner organisations for many years.

The 2018 report card presents the second assessment of cultural heritage indicators and closely follow methods conducted for the 2015 report card. The geographical region covered by the Mackay-Whitsunday-Isaac report card is divided into five zones. The 2018 report card assessed four of the five zones, with Cape Palmerston zone assessed for the first time. The five geographical zones are as follows:

**Zone 1:** St Helens Beach

**Zone 2:** Hook Island, Whitsunday Island and South Molle Island

**Zone 3:** Cape Hillsborough, incorporating Andrews Point, Wedge Island, Finlayson Point and Halliday Bay

<sup>1</sup> <https://healthyriverstoreef.org.au/report-card/report-card-download/>

#### Zone 4: Cape Palmerston

#### Zone 5: The Mackay Region

The methodology undertaken to assess the indicators was reviewed externally in 2015. While the indicators remained the same, the 2018 assessment gave a more balanced and culturally appropriate picture with a greater emphasis on Traditional Owner values and perspectives included in the 'spiritual/social values' indicator (Markwell and Associates 2019). For further information on the methods for the 2018 cultural heritage assessment see the 'Methods for the Mackay-Whitsunday-Isaac Report Card 2018 Human Dimensions Indicators'<sup>1</sup>.

Overall scores for the 2018 cultural heritage assessment can be seen in Table 15. Zone 2 (Whitsunday and Hook Islands) and Zone 3 (Cape Hillsborough) scored a B (good) and C (moderate) respectively, reflecting similar scores to the 2015 report card. Zone 1 (St Helens) score changed from an E (very poor) in 2015 to a D (poor) for the 2018 report card. Overall, the score for the Mackay-Whitsunday-Isaac Region for the 2018 report card was moderate. Whilst it appears there have been improvements in scores between 2015 and 2018 reporting, this is likely due to the greater weight that was applied in the 2018 report card on the significance of sites to Traditional Owners (i.e the Spiritual/Social Value indicator). This was achieved through inclusion of the measure 'Importance site to Traditional Owners', which was assessed in 2018 cultural heritage reporting for the first time (Markwell and Associates 2019).

Table 15. Overall scores for Cultural heritage indicators for the 2018 report card compared to the 2015 report card.

Zone		2018 report card	2015 report card
St Helens	Average score	2.5	1.1
	Grade	D	E
Whitsundays - Hook Is	Average score	3.6	3.7
	Grade	B	B
Cape Hillsborough	Average score	2.7	2.6
	Grade	C	C
Cape Palmerston	Average score	2.5	-
	Grade	D	-
Average score for Region		2.8	2.5
Overall grade for Region		C	D

■ A (4.6 to 5) | ■ B (3.6 to 4.5) | ■ C (2.6 to 3.5) | ■ D (1.6 to 2.5) | ■ E (0 to 1.5)

#### 4.1. St Helens

The scores for Zone 1: St Helens, are provided in Figure 10. Sites in this zone fall in the boundary of the Yuwibara peoples. Two sites in this zone were located and assessed, including a shell midden. A total of four DATSIP sites are registered in this zone. Overall, St Helens zone was scored poor (D), with

<sup>1</sup><https://healthyriverstoreef.org.au/report-card/report-card-download/>

the cultural maintenance indicator scoring very poor. The greatest impact to the sites assessed at St Helens was erosion.

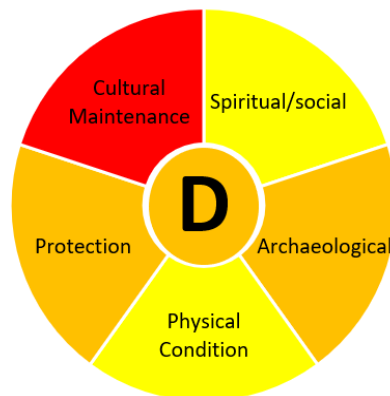


Figure 10. St Helens cultural heritage scores for the 2018 report card.

#### 4.2. Islands of the Whitsundays

The scores for Zone 2: Whitsunday and Hook Islands are provided in Figure 11. Sites in this zone fall in the boundary of the Ngaro peoples. Overall Zone 2 scored good (B). Four sites were located and assessed, including a rock shelter, rock paintings, engravings and a shell midden. Sixteen sites are registered on DATSIP. The greatest threats to sites assessed across Whitsunday and Hook Islands included potential damage and vandalism due to high visitation rates.

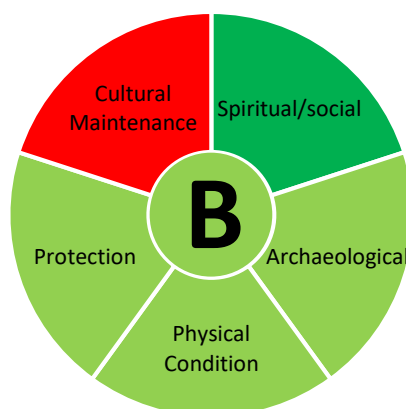


Figure 11. Islands of the Whitsundays cultural heritage scores for the 2018 report card.

#### 4.3. Cape Hillsborough

The scores for Zone 3: Cape Hillsborough are provided in Figure 12. Sites in this zone fall within the boundary of the Yuwibara peoples. Overall Zone 3 scored moderate (C) for the 2018 report card. Nine sites were located and assessed for the 2018 report card, including a rock shelter, shell midden, fish

trap, quarry and shell scatters. Thirty-one sites are registered on DATSIP. The greatest impacts identified to sites assessed in Zone 3 included erosion, vandalism and weed invasion.

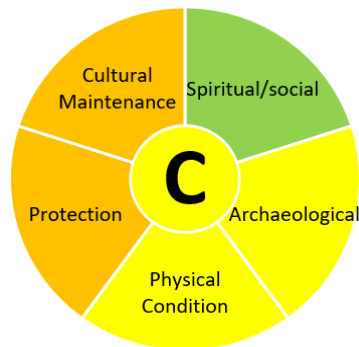


Figure 12. Cape Hillsborough cultural heritage scores for the 2018 report card.

#### 4.4. Cape Palmerston

The scores for Zone 4: Cape Palmerston are provided in Figure 13. Sites in this zone occur across shared country between Yuwibara, Barada and Koinmerburra peoples. Overall Zone 4 scored poor (D) for the 2018 report card. Nine sites were located and assessed, including a scar tree, shell midden, stone resource and shell and artefact scatters. Twenty sites are registered on DATSIP. The greatest impacts identified to sites assessed included erosion, which was due to tracks and vehicle traffic.

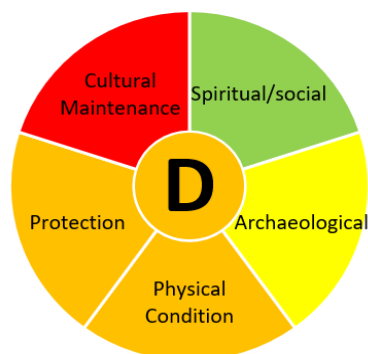


Figure 13. Cape Palmerston cultural heritage scores for the 2018 report card.

Confidence for cultural heritage assessments are provided in Table 16. Cape Palmerston scores were assessed for confidence for the first time in the 2018 report card.



**Table 16. Confidence associated with cultural heritage indicators in the Mackay-Whitsunday-Isaac 2018 report card.** Confidence criteria are scored 1-3 and then weighted by the value in the parenthesis. Final scores (4.5-13.5) are additive across weighted confidence criteria. Final scores correspond to a rank from 1-5 (very low- very high), which indicates final confidence level. Confidence scores differed between zones, with the scores for St Helens zone in brackets.

Indicator category	Maturity of methodology (x0.36)	Validation (x0.71)	Representativeness (x2)	Directness (x0.71)	Measured error (x0.71)	Final	Rank
Spiritual/Social values	1	2	2 [3]	2	1	7.9 [9.9]	2 [3]
Scientific values of sites	1	2	2 [3]	2	1	7.9 [9.9]	2 [3]
Physical condition of sites	1	2	2 [3]	2	1	7.9 [9.9]	2 [3]
Protection of sites and zones	1	2	2 [3]	2	1	7.9 [9.9]	2 [3]
Land use within zones	1	2	2 [3]	2	1	7.9 [9.9]	2 [3]
Cultural maintenance of sites and zones	1	2	2 [3]	2	1	7.9 [9.9]	2 [3]

**Rank based on final score:** 1 (very low): 4.5 – 6.3; 2 (low): >6.3 – 8.1; 3 (moderate): >8.1 – 9.9; 4 (high): >9.9 – 11.7; 5 (very high): >11.7 – 13.5.

#### 4.5. Cultural heritage site recommendations

A number of recommendations were provided by the TORG and Markwell and Associates to assist in reducing adverse impacts to cultural heritage sites assessed in the 2018 report card. Actions to address any of the recommendations provided would be need to be undertaken with full participation and approval of the Traditional Owners.

**Zone 1: St Helens** - Stabilisation of erosion areas was recommended for the shell middens assessed, which was highlighted as the major impact to sites in this zone.

**Zone 2: Whitsunday and Hook Islands** – Due to high visitation rates at some of the sites assessed in Zone 2, establishing a management plan to include targeted education for visitor behaviour at the sites was recommended.

**Zone 3: Cape Hillsborough** - Stabilisation of erosion areas was recommended in this zone due to imminent erosion threat, in addition to Traditional Owner involvement in other site maintenance strategies, including establishing site barriers and the development of interpretive material for education and engagement.

**Zone 4: Cape Palmerston** – Stabilisation of sites to minimise erosion impacts was recommended, including re-routing vehicle tracks or low-level fencing in areas of high erosion.

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