



Australian Government

Great Barrier Reef  
Marine Park Authority



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Government

# Assessment and Monitoring of the Human Dimensions within the Reef 2050 Integrated Monitoring and Reporting Program:

## Final Report of the Human Dimensions Expert Group



The Great Barrier Reef Marine Park Authority acknowledges the continuing sea country management and custodianship of the Great Barrier Reef by Aboriginal and Torres Strait Islander Traditional Owners whose rich cultures, heritage values, enduring connections and shared efforts protect the Reef for future generations.

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## Acronyms

<b>ABARES</b>	Australian Bureau of Agricultural and Resource Economics and Sciences
<b>ABS</b>	Australian Bureau of Statistics
<b>ACS</b>	Aspirations, Capacity and Stewardship
<b>AIMS</b>	Australian Institute of Marine Science
<b>AMSA</b>	Australian Maritime Safety Authority
<b>BMP</b>	Best Management Practice
<b>CEO</b>	Chief Executive Officer
<b>CH</b>	Culture and Heritage
<b>CQU</b>	Central Queensland University
<b>CV</b>	Community Vitality
<b>DAE</b>	Access Economics
<b>DPSIR</b>	Drivers-Pressures-State-Impact-Response
<b>EELTMP</b>	Ecological Economic Long-Term Monitoring Program
<b>EMC</b>	Environment Management Charge
<b>EOI</b>	Expression of Interest
<b>EV</b>	Economic Values
<b>FTE</b>	Full Time Employees
<b>GBRMP</b>	Great Barrier Reef Marine Park
<b>The Authority</b>	Great Barrier Reef Marine Park Authority
<b>GBRWHA</b>	Great Barrier Reef World Heritage Area
<b>GRP</b>	Gross Regional Product
<b>GU</b>	Griffith University
<b>HDEG</b>	Human Dimensions Expert Group
<b>IPBES</b>	Intergovernmental Panel on Biodiversity and Ecosystem Services
<b>JCU</b>	James Cook University
<b>LGA</b>	Local Government Area
<b>MPA</b>	Marine Protected Area
<b>MSQ</b>	Maritime Safety Queensland
<b>MTQ</b>	Museum of Tropical Queensland

<b>NESP</b> .....	National Environmental Science Programme
<b>NRM</b> .....	Natural Resource Management
<b>NPSR</b> .....	Department of National Parks, Sport and Racing
<b>OUV</b> .....	Outstanding Universal Value
<b>PAM</b> .....	Protected Areas Management
<b>PCB</b> .....	Princess Charlotte Bay
<b>PoM</b> .....	Plan of Management
<b>QDAF</b> .....	Queensland Department of Agriculture and Fisheries
<b>QDEHP</b> .....	Queensland Department of Environment and Heritage Protection
<b>QDES</b> .....	Queensland Department of Environment and Science
<b>QGSO</b> .....	Queensland Government Statistician's Office
<b>QoL</b> .....	Quality of Life
<b>QPWS</b> .....	Queensland Parks and Wildlife Service
<b>OGBR</b> .....	Office of the Great Barrier Reef
<b>Reef</b> .....	Great Barrier Reef
<b>Reef 2050 Plan</b> .....	Great Barrier Reef 2050 Long-Term Sustainability Plan
<b>RIMReP</b> .....	Reef 2050 Integrated Monitoring and Reporting Program
<b>SELTMP</b> .....	Social and Economic Long-Term Monitoring Program
<b>TEK</b> .....	Traditional Ecological Knowledge
<b>TMR</b> .....	Department of Transport and Main Roads
<b>TRA</b> .....	Tourism Research Australia
<b>UC</b> .....	University of Canberra
<b>UNSW</b> .....	University of New South Wales
<b>WH</b> .....	World Heritage
<b>WQ</b> .....	Water Quality

## 1.0 Executive Summary

The National Environmental Science Programme (NESP) Project 3.2.2 and funds provided through the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP) have provided a methodology for assessing and monitoring the Great Barrier Reef (Reef)'s human dimensions as a key mechanism to support governance and management of the World Heritage Area. The work has used a conceptual framework to identify appropriate sets of indicators for characterising the desired state of the Reef's human dimensions at the whole-of-Reef and regional scales. Using this framework, 25 indicator attributes that describe people's relationship with the Reef were grouped into five key attribute clusters which align with the *Reef 2050 Long-Term Sustainability Plan* (Reef 2050 Plan) Outcomes. These are: (i) human aspirations, capacities and stewardship associated with the Reef (aligned with all seven outcomes of the Reef 2050 Plan); (ii) community vitality related to Great Barrier Reef outcomes (aligned with the Community Benefits outcome of the Reef 2050 Plan); (iii) economic values related to Great Barrier Reef outcomes (aligned with the Economic Benefits outcome of the Reef 2050 Plan); (iv) culture and heritage related to the Reef (aligned with the Heritage outcome of the Reef 2050 Plan); and (v) the health of governance systems affecting Reef outcomes (aligned with the Governance outcome of the Reef 2050 Plan). This work was undertaken with collaboration and input from the Reef-wide (RIMReP) Human Dimensions Expert Group and six Regional Discussion Panels in the Reef catchment. Populating this framework to determine the state of the human dimensions associated with the Reef requires a rich evidence base. As a result of this work, alignment of the human dimensions framework with Reef 2050 Plan targets, objectives and outcomes has revealed several significant gaps for monitoring implementation of the Reef 2050 Plan.

The Social and Economic Long-Term Monitoring Program (SELTMP) data are the only longer term socio-economic data that are collected specifically for governance and management purposes in the Reef catchment. SELTMP surveys collect a range of attitudinal data from coastal residents and Reef visitors between Cooktown and Bundaberg. However, logistical and cost limitations have so far restricted sampling of Eastern Cape York region. Other useful sources of information that were used by the NESP Project 3.2.2 team were compiled from government agencies, research organisations, peer-reviewed literature, grey literature and other forms of knowledge such as Indigenous and local knowledge. Several secondary datasets were used consistently in the 2017 human dimensions regional benchmarking reports. Most of these were relevant at the local government area scale, however, Reef-specific data were hard to extract. Further, data sets pertaining to Eastern Cape York were either unavailable or difficult to obtain.

Though the gap analysis, the Human Dimensions Expert Group identified new data sources, programs and activities which are **critical** for the successful assessment and monitoring of the Reef's human dimensions, and which need to be funded into the future to enable monitoring of the Reef 2050 Plan and effective decision making at multiple scales across the Reef. Specific considerations of assessment and monitoring from the perspectives of Traditional Owners is being undertaken by the RIMReP Indigenous Heritage Expert Group, and thus were not considered by the Human Dimensions Expert Group at this point in time. Use of free and readily available data sets in combination with the following proposed new monitoring programs and activities are seen as core to meeting human dimensions targets, objectives

and outcomes articulated in the Reef 2050 Plan, and for addressing significant gaps. The key gaps of significance that have been identified include:

- Attitudinal surveys of residents, visitors, Traditional Owners, national and international stakeholders;
- Surveys to elicit economic dependency on the Reef;
- Analysis of social surveys and big data sets to elicit human use and visitation patterns;
- Non-market valuation monitoring;
- Recreational fishing effort;
- Aesthetics monitoring;
- Historic maritime heritage;
- Media tracking and analysis ;
- Insights into stewardship and behaviour change;
- Long-term human dimensions benchmarking; and
- Governance benchmarking.

Ongoing collection, analysis and synthesis of data showing progress against Reef 2050 targets, objectives and outcomes needs to be adequately funded and integrated into the governance framework for RIMReP into the future to fulfil the Reef 2050 Plan reporting of the Reef's human dimensions. This report details how the gap analysis was undertaken, and Executive Summary Table 1 shows necessary activities needed if key data gaps are to be closed. Some activities listed in the table are not on-going monitoring programs, but they need to be completed **before** monitoring can commence. At this point, we are not recommending how these activities should be best resourced.

**Executive Summary Table 1. Activities required for an on-going GBR human dimensions monitoring program (Same as Table 11).**

<b>Activity to address monitoring gaps</b>
Governance benchmarking
Human Dimensions benchmarking
Great Barrier Reef System of Experimental Environmental Accounts — non-market valuations and economic contribution of Reef-dependent industries
Insights into stewardship and behaviour change of Reef-dependent communities and industries
Recreational index — Non-market valuations
Reef Use and Visitation Patterns — tourism trends
Reef SELTMP — covers attitudes, economic dependency, social and cultural values, satisfaction with management and governance arrangements, human use patterns
Locate and assess condition of the historic shipwreck Heroine (1846) in the Whitsunday Plan of Management
Historic maritime heritage — assessment and monitoring of key ship wrecks (Yongala, Foam, Mermaid, Pandora, Gothenburg, Llewellyn) and island light houses
Princess Charlotte Bay historic maritime heritage sites — Indigenous and non-Indigenous <sup>1</sup>
Aesthetic value monitoring
Big Data — Tourism Economic Impact Model
Comprehensive synthesis of cultural heritage places on the Great Barrier Reef. <sup>2</sup>
Dynamic predictive modelling of the vulnerability of Indigenous, non-Indigenous and shared Great Barrier Reef heritage <sup>3</sup>
Trialling and using geo-indicators to monitor the vulnerability of Indigenous and non-Indigenous Great Barrier Reef heritage <sup>4</sup>

<sup>1</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team

<sup>2</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team

<sup>3</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team

<sup>4</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team



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**Activity to address monitoring gaps**

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Use of longitudinal data for predictive modelling of social and economic factors that have the most 'influence' on the Reef and those which are most influenced by Reef health. *Survey of people from within and outside the Great Barrier Reef catchment area*

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Predictive modelling of economic factors that have the most 'influence' on the Reef and those which are most influenced by Reef health. *Surveys of (a) Great Barrier Reef catchment residents; (b) Businesses and other organisations operating in the Reef; and (c) Reef visitors*

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Media tracking and analysis

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Site-specific recreational fishing surveys through expansion of QDAF boat ramp survey (BRS) in regional areas accessing the Great Barrier Reef, to monitor fishing effort, number and species of fish kept and released, catch rates, visitation and residential suburb of the visitor.

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Reef Stewardship Assessment and Monitoring Program Design

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Tracking Environmental Stewardship Indicators – farming sector

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## Contents

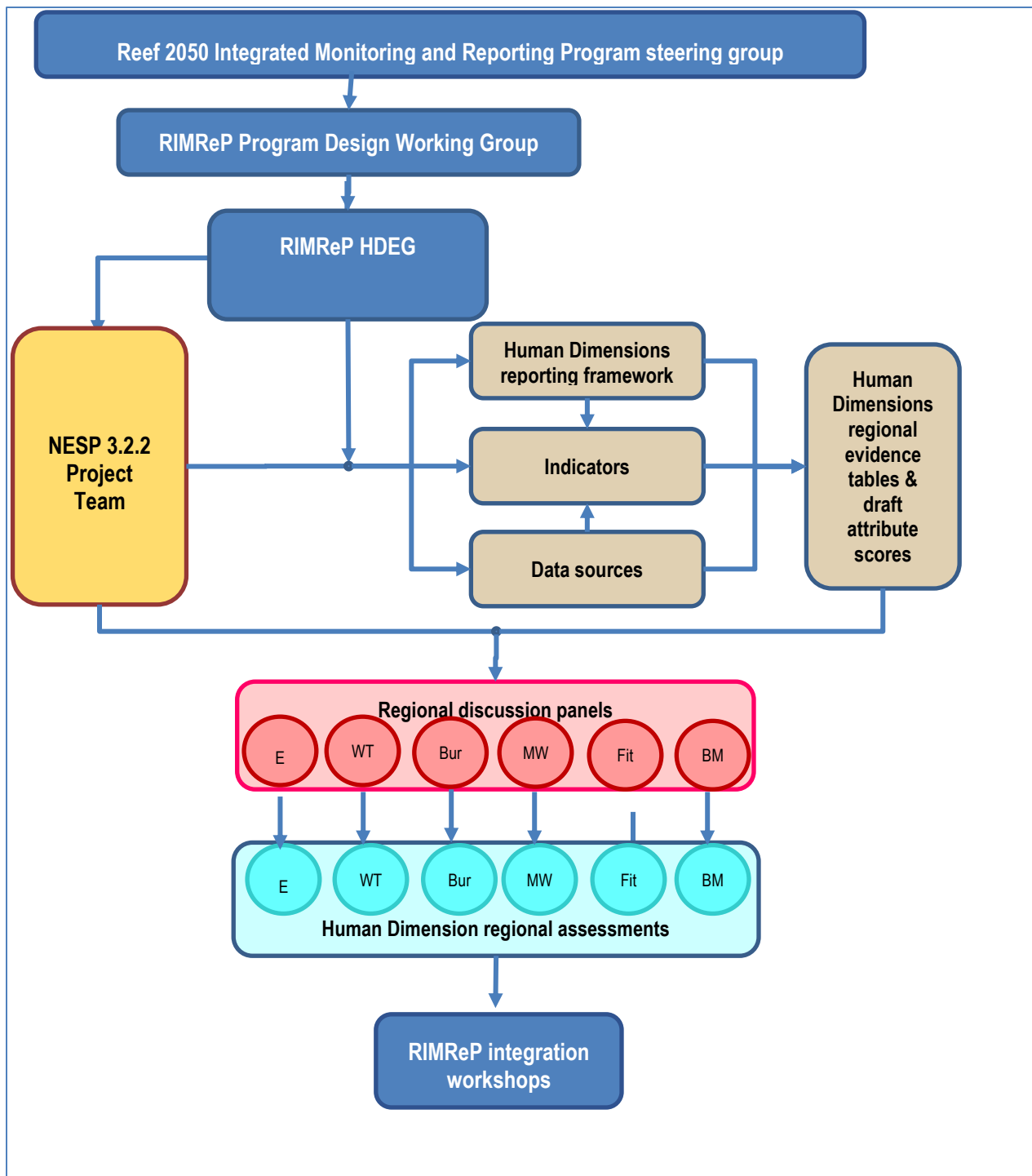
Acknowledgements .....	i
Acronyms .....	ii
1.0 Executive Summary.....	iv
2.0 Background and design considerations .....	1
2.1 Objectives of the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP) ..	3
2.2 Information needs for the Great Barrier Reef Outlook Report and other reporting requirements .....	6
2.3 Relevant <i>Reef 2050 Long-Term Sustainability Plan</i> targets, objectives and outcomes ..	6
2.4 Information needs for Great Barrier Reef management .....	9
3.0 Current understanding of the Great Barrier Reef's human dimensions .....	12
3.1 Key components and processes that make up the Great Barrier Reef's human dimensions .....	12
3.2 Relevant conceptual diagrams .....	14
4.0 Suggested sets of indicators (indices) to monitor human dimensions of the Great Barrier Reef .....	19
4.1 Major characteristics of a healthy resilient system .....	20
4.2 Benchmarking to track progress .....	27
5.0 Current Status of the Great Barrier Reef's human dimensions .....	28
5.1 Priority indicators to monitor the Great Barrier Reef's human dimensions .....	29
6.0 Evaluation of the adequacy of current monitoring of the Great Barrier Reef's human dimensions.....	35
6.1 Synopsis of existing monitoring programs .....	35
6.1.1 A brief description of Social and Economic Long-Term Monitoring Program.....	35
7.0 Adequacy of existing monitoring programs .....	37
7.1 Adequacy of the Social and Economic Long-Term Monitoring Program .....	37
7.2 Adequacy of other (secondary) data sets .....	40
7.3 Gaps in current monitoring effort .....	41
8.0 New technologies for monitoring the Great Barrier Reef's human dimensions.....	42
9.0 Recommendations for integrated monitoring of the Great Barrier Reef's human dimensions.....	42
10.0 Recommendations for monitoring design.....	43
11.0 Assessment of activities required to implement the recommended design .....	58
12.0 References.....	61
12.1 Works Consulted .....	64

13.0	Appendix 1 .....	68
14.0	Appendix 2 – Appendix 8.....	73
15.0	Appendix 9 .....	74
16.0	Appendix 10 .....	91

## 2.0 Background and design considerations

Four of the seven themes of the *Reef 2050 Long-Term Sustainability Plan* (Reef 2050 Plan) are concerned with the human dimensions of the Great Barrier Reef (Reef). That is, they contain actions, targets, objectives and outcomes relevant to the social, cultural, institutional and economic factors that shape people's relationship with the Reef. In 2017, the National Environmental Science Programme (NESP) Project 3.2.2 funded the development of an approach to assess and monitor the Reef's human dimensions to support governance and management. It used a conceptual framework to identify appropriate sets of indicators for characterising the desired state of the Reef's human dimensions at the whole-of-Reef and regional scales. NESP Project 3.2.2 was completed with collaboration and input from the RIMReP Human Dimensions Expert Group (Reef-wide) and six Regional Discussion Panels in the Reef catchment (refer to Figure 1) The approach implemented the following six steps, which are described later in this report:

- **Step 1:** Development of a human dimension indicator framework comprised of broad themes (clusters) and attributes which are aligned with themed outcomes of the Reef 2050 Plan.
- **Step 2:** Application of the indicator framework to construct evidence tables and identify critical data gaps.
- **Step 3:** Development of a set of decision rules to guide index development and rating.
- **Step 4:** Regional discussion panels convened to (a) appraise the evidence presented in evidence tables through a regional lens; (b) add additional expert knowledge to fill data gaps; (c) record data gaps and limitations; (d) discuss proposed ratings (on a scale of 1-5) for each attribute; and (e) provide an overall assessment for each cluster.
- **Step 5:** Data were analysed and synthesised and presented as a series of reports.
- **Step 6:** Links to the RIMReP were maintained throughout the project via the RIMReP Human Dimensions Expert Group (HDEG).



**Figure 1. Relationship between NESP Project 3.2.2: *Cost-effective indicators and metrics for assessment and monitoring of the Great Barrier Reef’s human dimensions* and the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP).**

## 2.1 Objectives of the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP)

The *Reef 2050 Long-Term Sustainability Plan* (Reef 2050 Plan) provides an overarching strategy for managing the Great Barrier Reef. It contains actions, targets, objectives and outcomes to address threats and protect and improve the Reef's health and resilience, while allowing ecologically sustainable use. The Reef 2050 Plan has been developed in consultation with partners, including Traditional Owners and the resource, ports, fishing, agriculture, local government, research and conservation sectors. A key component of the Reef 2050 Plan is the establishment of RIMReP, which will provide a comprehensive and up-to-date understanding of the Reef — the values and processes that support it and the threats that affect it. This knowledge is fundamental to informing actions required to protect and improve the Reef's condition and to drive resilience-based management.

There are currently over 90 monitoring programs operating in the Great Barrier Reef World Heritage Area and adjacent catchment. These programs have been designed for a variety of purposes and operate at a variety of spatial and temporal scales. The comprehensive strategic assessments of the Great Barrier Reef World Heritage Area and adjacent coastal zone — both of which formed the basis for the Reef 2050 Plan — identified the need to ensure existing monitoring programs align with each other and with management objectives. RIMReP will fulfil this need. RIMReP will provide information across the seven themes that make up the Reef 2050 Plan Outcomes Framework. The themes are ecosystem health; biodiversity; water quality; heritage; community benefits; economic benefits and governance. The intent of RIMReP is not to duplicate existing arrangements but to coordinate and integrate existing monitoring, modelling and reporting programs across disciplines. For example, the Reef 2050 Water Quality Improvement Plan underpins the Reef 2050 Plan's water quality theme, and its Paddock to Reef 2050 Integrated Monitoring, Modelling and Reporting Program will form a key part of RIMReP.

As the driver of resilience-based management under the Reef 2050 Plan, RIMReP's primary purpose is to enable timely and suitable responses by Reef managers and partners to emerging issues and risks, and to enable the evaluation of whether the Reef 2050 Plan is on track to meet its outcomes, objectives and targets. RIMReP's vision is to develop a knowledge system that enables resilience-based management of the Reef and its catchment, and provides managers with a comprehensive understanding of how the Reef 2050 Plan is progressing. Three goals for the knowledge system are that it is:

- Effective in enabling the early detection of trends and changes in the Reef's environment, informing the assessment of threats and risks, and driving resilience-based management.
- Efficient in enabling management priorities and decisions to be cost effective, transparent, and based on cost-benefit and risk analyses.

- Evolving based on the findings of The Great Barrier Reef Outlook Reports, new technologies and priority management and stakeholder needs.

RIMReP will be central to ensuring decisions regarding the protection and management of the Reef are based on the best available science, consistent with the principles of transparency and accountability, and underpinned by a partnership approach (see Figure 2).



**Figure 2. RIMReP program logic: Each of the three goals has associated development and implementation objectives as well as foundational inputs.**



## 2.2 Information needs for the Great Barrier Reef Outlook Report and other reporting requirements

The Human Dimensions Expert Group have adopted the same set of **human dimension values** used by the Great Barrier Reef Marine Park Authority for assessment, monitoring and management of activities within the Great Barrier Reef Marine Park (GBRMP). These are:

- Access to Reef resources;
- Reef aesthetics;
- Appreciation, understanding and enjoyment of the Reef;
- Human health associated with the Reef;
- Personal connection to the Reef;
- Intra and inter-generational equity associated with the Reef;
- Empowerment derived from the Reef;
- Employment and income derived from Reef-dependent industries; and
- Heritage (the Great Barrier Reef Marine Park Authority, 2017a) (Refer to Appendix 1 for details).

## 2.3 Relevant Reef 2050 Long-Term Sustainability Plan targets, objectives and outcomes

An objective of the RIMReP is to track progress towards achieving the relevant targets, objectives and outcomes of the Reef 2050 Plan. Table 1 identifies the Reef 2050 Plan targets, objectives and outcomes that the monitoring activities recommended in this report will address.

**Table 1. Reef 2050 Plan targets, objectives and outcomes that the monitoring activities recommended in this report will address.**

Reef 2050 Plan Outcome	Reef 2050 Plan Objective	Reef 2050 Plan Target
<b>Community benefits</b> An informed community that plays a role in protecting the Reef for the benefits a healthy Reef provides for current and future generations	CBO1: The rights of Traditional Owners to derive benefits from the conservation and cultural use of biological resources are recognised	CBT1: Increase in Traditional Owner benefit sharing initiatives
	CBO2: A healthy Reef that supports sustainable lifestyles and livelihoods, and provides coastal communities with protection from extreme weather events	
	CBO3: Community benefits provided by the Reef including its superlative natural beauty and sense of place, are maintained for current and future generations.	CBT2: Community Benefit values identified and considered in decision-making

	<p>CBO4: Local, regional and Reef-wide community benefits are understood and the community is actively engaged in managing Reef activities</p>	<p>CBT3: Community participation in stewardship actions to improve Reef health and resilience continues to grow</p> <p>CBT4: Community benefit values for the Reef coastal ecosystems are being monitored and show a positive trend</p>
<p><b>Heritage</b> Indigenous and non-Indigenous heritage values are identified, protected, conserved and managed such that the heritage values maintain their significance for current and future generations</p>	<p>HO1: Traditional Owners' heritage rights and responsibilities are incorporated in all facets of management</p>	<p>HT1: New and effective cooperative management practices are developed for protection and conservation of Indigenous and non-Indigenous heritage of the Reef</p>
	<p>HO2: Indigenous and non-Indigenous heritage including natural, aesthetic, historic, scientific, and social values are identified, conserved and managed in partnership with the community</p>	<p>HT2: Indigenous and non-Indigenous heritage values are defined, documented and protected in decision-making and planning processes</p>
		<p>HT3: Partnerships between Traditional Owners and all stakeholders are increased to ensure key Reef heritage values are identified, documented and monitored</p>
<p><b>Biodiversity</b> The Reef maintains its diversity of species and ecological habitats in at least a good condition with a stable to improving trend</p>	<p>BO1: Traditional Owners are engaged and participate in and manage the conservation and sustainable use of cultural keystone species and biocultural resources</p>	<p>BT1: Customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or cultural use requirements are formally recognised and adopted in management arrangements</p>
<p><b>Ecosystem Health</b> The status and ecological functions of ecosystems within the Great Barrier Reef World Heritage Area are in at least good condition with a stable to improving trend</p>	<p>EHO1: The knowledge, innovations and practices of Traditional Owners relevant for conservation and cultural use of biocultural diversity are preserved and maintained</p>	<p>EHT1: Traditional Owners have TEK management systems for collecting, handling and sharing culturally sensitive information, and integration in decision-making</p>
		<p>EHT2: Number of agreements with Traditional Owners addressing management of ecosystems within their traditional estates is increased</p>
		<p>EHT4: Key direct human-related activities are managed to reduce cumulative impacts and achieve a net benefit for the Reef</p>

<b>Governance</b> The outstanding universal value of the Reef is maintained and enhanced each successive decade through effective governance arrangements and coordinated management activities	GO1: Governance arrangements support effective implementation review and maintenance of the Reef 2050 Plan	GT1: Implementation, reporting and review of the Reef 2050 Plan is based on the principles of transparency, ownership, accountability, responsiveness and the strong involvement of Traditional Owners, industry, researchers and the community
	GO2: The Reef 2050 Plan guides decisions about the Reef made by governments, industry and the community	GT2: The visions, outcomes objectives and targets in the Reef 2050 Plan are taken into account in relevant regulation, documents, policies and strategies of all levels of government
		GT3: Actions under the Reef 2050 Plan are prioritised and tailored to reflect local or regional differences in threats to the values of the Reef
<b>Governance</b> The outstanding universal value of the Reef is maintained and enhanced each successive decade through effective governance arrangements and coordinated management activities	GO2: The Reef 2050 Plan guides decisions about the Reef made by governments industry and the community	GT4: Investment in actions is prioritised using evidence-based risk assessment to maximise benefits for Reef health and resilience
	GO3: Strong partnerships with Traditional Owners, industry researchers and the community support protection and management of the Reef	
	GO4: An adaptive management approach underpins implementation of the Reef 2050 Plan, and results in governance arrangements and processes.	GT5: A comprehensive Integrated Monitoring and Reporting Program is established and operational, and the reporting informs the review and updating of the Reef 2050 Plan
<b>Economic Benefits</b> Economic activities within the Great Barrier Reef World Heritage Area and its catchments sustain the Reef's outstanding universal value	EBO1: Traditional Owners derive economic benefits from conservation and sustainable use of biological resources	EBT1: There is an increase in the number of Traditional Owner service providers and viable businesses
		EBT2: The number of employment opportunities for Traditional Owners in sea country management and Reef-based industries is increased

	EBO2: Protecting the Reef's outstanding universal value is embedded within decision making, with impacts first avoided, then mitigated and then as a final consideration, any residual impacts are offset to achieve a net environmental benefit	EBT3: Cumulative impacts on the Reef from human activities are understood, and measures to ensure a net environmental benefit approach for the Reef are in place
	EBO3: Reef-associated industries are planned and managed in such a way as to protect the Reef's outstanding universal value and are sustainable, productive and profitable	EBT4: Shipping in the Reef is safe, risks are minimised and incidents are reduced to as close to zero as possible
	EBO4: Reef-dependent industries are productive and profitable based on a healthy Reef and are ecologically sustainable	EBT5: The relationship between Reef health and the viability of Reef-dependent industries (e.g. tourism and fishing) is understood and considered in planning and development decisions.
		EBT6: Economic indicators are included in the RIMReP
<b>Water Quality</b> Reef water quality retains the outstanding universal value, builds resilience and improves ecosystem health over each successive decade		WQT5: Traditional Owners, industry and community are engaged in on-ground water quality improvement and monitoring

## 2.4 Information needs for Great Barrier Reef management

Interviews with 45 Reef managers<sup>5</sup> (Udy, 2017) identified three categories of management information needs:

- **Maps** showing the *spatial distribution* of various attributes;
- **Temporal mapping** of condition and value and changes over time; and

<sup>5</sup> In this document, 'Great Barrier Reef managers' refers to policy officers and field staff of the Great Barrier Reef Marine Park Authority, Queensland State Departments and the Commonwealth Department of Environment and Energy, but excludes industry bodies, Traditional Owners and other community members with an acknowledged role in Reef management.

- ***Process understanding*** of causal factors that inform decision support tools, to predict the outcomes of management actions.

Information derived from human dimensions assessment and monitoring across these three categories can be used to inform the Reef 2050 Plan at the tactical, operational or strategic level, and be used for evaluation and reporting (Table 2).

**Table 2. Examples of how social data can be used for different management purposes, Based on Udy (2017).**

	Category of management use				
	Tactical	Operational	Strategic planning	Quantifying effectiveness	Reporting
	<ul style="list-style-type: none"> <li>Incident response</li> <li>Cyclone</li> <li>Oil spill</li> <li>Coral bleaching</li> </ul>	<ul style="list-style-type: none"> <li>Permit assessment</li> <li>Prioritise compliance effort</li> </ul>	<ul style="list-style-type: none"> <li>Reef 2050 Plan</li> <li>Policy development</li> <li>PoMs, Zoning</li> </ul>	Results of resource investment, policy implementation	<ul style="list-style-type: none"> <li>Report cards</li> <li>Outlook</li> </ul>
Hierarchical monitoring	Application of human dimensions data – some examples				
Spatial extent: <ul style="list-style-type: none"> <li>Socially, culturally and economically significant places</li> </ul>	Maps identify areas needing additional management actions to protect/restore benefits	Maps improve ability to balance conflicting uses and manage for economic benefits	Maps ensure future planning considers socially culturally and economically significant places	Maps improve assessment of actions by identifying places of high social, economic and cultural significance.	Maps are a clear visual tool to illustrate and communicate Great Barrier Reef benefits
Temporal trend: <ul style="list-style-type: none"> <li>Condition and values over time and map to DPSIR</li> </ul>	Maps can indicate whether intervention is required	Provide guidance on choice of management tool(s) for achieving desired outcome(s)	Focus use of planning tools on regions that are not improving	Compare effectiveness of different actions in reaching objectives across regions	Spatial change since last reporting period
Process understanding <ul style="list-style-type: none"> <li>Cause-effect</li> <li>Problem-solution (DPSIR)</li> </ul>	Identify possible recovery paths and the role management can have on assisting resilience	Consider social, cultural and economic impacts of <b>each</b> permit and use to build knowledge of cumulative impacts	Predict likely pathway for recovery and use tools to enhance resilience — e.g. special extent of consequences poor decisions due to weak governance arrangements	Understand multiple impacts of interventions and monitor to ensure actions achieve intended outcomes	Report on actions completed and outcomes achieved, supporting cause and effect understanding

### 3.0 Current understanding of the Great Barrier Reef's human dimensions

This section provides a description of our current understanding of the key components and processes that make up the Reef's social-ecological system, through the use of conceptual diagrams developed in the initial stages of the project. These diagrams illustrate likely cause-and-effect pathways, including drivers, pressures, impacts on human wellbeing, and potential responses that influence the condition (state) of human dimension values. This systems understanding helped to select priority indicators. In this section, we also describe the major characteristics of a healthy resilient system (i.e. desired state). Where possible and sensible, we provide a scientifically credible ranges for each key indicator, based on multiple lines of evidence that defines a healthy state and provides a benchmark against which the status of the human dimension value can be compared over time.

#### 3.1 Key components and processes that make up the Great Barrier Reef's human dimensions

The human dimensions of the Reef are the social, cultural, institutional and economic factors that shape people's relationship with the Great Barrier Reef. Managers realise that these relationships are diverse and wide-ranging and include collective actions by industries, communities and governments, each influencing Reef resilience<sup>6</sup>. Communities with a relationship with the Reef range from residents in catchment towns and cities, including Traditional Owners, to people across the nation or globe, that may either have an interest in the Reef or influence (directly or indirectly) the condition of the Great Barrier Reef. This also includes government agencies (i.e. local government, state and Commonwealth governments). They also include people in the maritime and catchment industries (Table 3).

**Table 3. Great Barrier Reef industry stakeholders**

<b>Coastal/Marine Primary Industries</b>	<b>Catchment- based Primary Industries</b>	<b>Services Industries</b>	<b>Extraction and development</b>
Commercial fishing	Cane	Marine and coastal tourism	Ports and shipping
Aquaculture	Grazing	Marine and coastal recreation	Urban development and construction

<sup>6</sup> This description of the human dimensions of the Great Barrier Reef and catchment was developed through discussions with managers and researchers, and will be developed further to inform the revision of the Great Barrier Reef Water Quality synthesis statement.

Dairy	Research	Mining/extractive industries
Horticulture		
Grains		
Forestry		

There are also people involved in a vast range of non-commercial activities related to the Reef, including: Traditional Owner use of marine and coastal resources; non-commercial recreational activities such as boating, diving, snorkeling; defence activities in designated areas; and fishing both recreational and illegal (i.e. intentional targeting of protected zones). For effective management, Great Barrier Reef managers need to know more about these relationships. Management of individual sites within the Reef needs to be informed by the number of people who directly use or visit the Reef; who these people are, where they go, what they do and why. Reviewed literature reveals that people's relationship with the Reef is also influenced by attitudes towards, and perceptions of, the Reef and its management. These attitudes and perceptions have changed considerably over time, and will no doubt change again in future, and are shaped by culture, societal norms, context and circumstances, including personal experiences, word-of-mouth, and print media. The literature has already highlighted factors that are very likely to affect attitudes and perceptions relating to the Reef including:

- Familiarity with the Reef and its management;
- Occupation;
- Proximity to the Reef;
- Access to the Reef and its resources;
- Identity with and/or affinity for the Reef;
- Dependency on the Reef's resources for income or other benefits;
- Where people go and what they do in the Reef;
- What people value about the Reef;
- Motivations for visiting the Reef;
- Sense of optimism about the future of the Reef;
- Understanding of factors that threaten Reef health;
- Knowledge of the current condition of the Reef;
- Levels of satisfaction with Reef-based experiences; and
- Levels of confidence and trust in Great Barrier Reef management (Gooch, 2016).

Indigenous Traditional Owners have had the longest association with the Great Barrier Reef, as custodians and sustainable exploiters of the Reef and its resources, the continuity of their relationship with the Reef having a stabilising influence on their attitudes and perceptions over many millennia. They still maintain connection to and responsibility for caring for particular country through membership of descent groups, families or clans.



More than 70 Traditional Owner groups are custodians of the Great Barrier Reef (The Great Barrier Reef Marine Park Authority, 2016a). Traditional Owner heritage values include all customs, lore and places that are part of Aboriginal and Torres Strait Islander peoples' spiritual links to land or sea country and which tell the story of Indigenous peoples from time immemorial to the present.

Traditional Owner values comprise tangible and non-tangible attributes, which often overlap – including sacred sites, sites of particular significance and places important for cultural tradition; Indigenous structures, technology, tools and archaeology; stories, song-lines, totems and languages; and cultural practices, observances, customs and lore. Traditional Owner heritage values are connected to and inter-related with other Reef values and should be considered in this context (The Great Barrier Reef Marine Park Authority, 2005; 2016a).

By contrast, non-Indigenous attitudes and perceptions are varied and can change relatively quickly, especially for those new to the Reef and its catchment. Non-Indigenous cultural heritage includes buildings, monuments, gardens, industrial sites, landscapes, cultural landscapes, archaeological sites, groups of buildings and precincts, or places which embody a specific cultural or historic value. Historic heritage relates to the occupation and use of an area since the arrival of European and other migrants and describes the way in which the many cultures of Australian people have modified, shaped and created the cultural environment. The Authority recognises four historic heritage values of the GBRMP — World War II features and sites; historic voyages and shipwrecks; lighthouses; and other places of historic significance (The Great Barrier Reef Marine Park Authority, 2005; 2017b; 2017c).

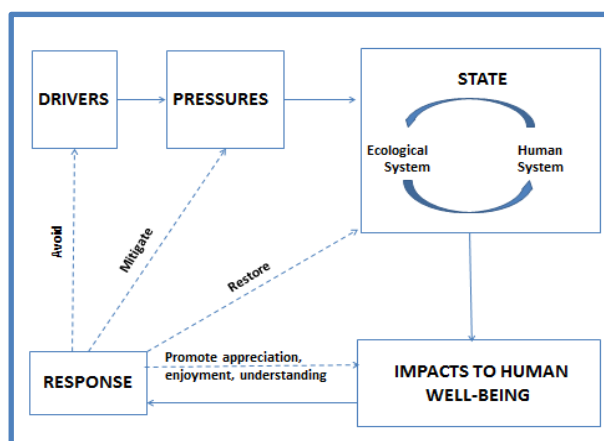
### 3.2 Relevant conceptual diagrams

To better understand, monitor and report on the complexities of the whole system, the RIMReP has adopted a modified Drivers-Pressures-State-Impact-Response (DPSIR) model, as shown in Figure 3. This organising framework, agreed to at an intergovernmental level, was applied in the Great Barrier Reef Strategic Assessment Report<sup>7</sup> and the Great Barrier Reef Outlook Report 2014.<sup>8</sup>

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<sup>7</sup> Great Barrier Reef Marine Park Authority, 2014a. *Great Barrier Reef Region Strategic Assessment: Strategic Assessment Report*. Townsville: The Great Barrier Marine Park Authority.

<sup>8</sup> Great Barrier Reef Marine Park Authority, 2014b. *Great Barrier Reef Outlook Report 2014*. Townsville. The Great Barrier Reef Marine Park Authority.



**Figure 3. Drivers-Pressures-State-Impact-Response framework adopted by the RIMReP.**

The DPSIR framework has been extensively modified and used across the globe for a variety of purposes over the past two decades, including as a mechanism to better understand, communicate and act on people's use of, and connections with, marine and coastal resources. Historically, biophysical scientists have tended to focus on the Pressure-State components of the framework, whereas social scientists have been known to concentrate on Drivers, Impacts, and Responses. Despite these differences however, there remains a central tenet of the DPSIR framework which links human well-being with environmental health.<sup>9</sup> DPSIR has also been used as a risk assessment tool, and this is perhaps its most powerful application. The framework can help identify risks, determine the cause or source of risks, enable consideration of the consequences of particular risks and provide a context for examining response options.<sup>10</sup> The adoption of the DPSIR framework as a unifying and organising framework for the assessment and monitoring of the Reef 2050 Plan is a logical step, as it organises understandings of cause-and-effect relationships in the complex social-ecological system of the Reef and its catchment. The DPSIR framework can be used to illustrate how people, groups and institutions not only drive change and create pressures, but also receive benefits which can be gained or lost, depending on water quality, biodiversity and ecosystem health. Table 4 presents DPSIR elements, together with element descriptions, and system understanding from the Human Dimensions Expert Group perspective.

<sup>9</sup> Patrício, J., M., Elliott, K., Mazik, K., Papadopoulou, C. and Smith. 2016. DPSIR—Two Decades of Trying to Develop a Unifying Framework for Marine Environmental Management *Frontiers in Marine Science* September 2016 3:177.

<sup>10</sup> Patrício, J., M., Elliott, K., Mazik, K., Papadopoulou, C. and Smith. 2016. DPSIR—Two Decades of Trying to Develop a Unifying Framework for Marine Environmental Management *Frontiers in Marine Science* September 2016 3:177.

**Table 4. System understanding of the Great Barrier Reef from a human dimensions perspective — based on the Drivers, Pressures, Impact, State, Response (DPSIR) framework.**

DPSIR elements	Element descriptions	System understanding from the Human Dimensions Expert Group perspective
<b>Drivers and influencing factors</b>	<p>The RIMReP adopts the drivers used in the <i>Great Barrier Reef Region Strategic Assessment Report</i><sup>11</sup> and the <i>Great Barrier Reef Outlook Report 2014</i><sup>12</sup> (i.e. Climate change, Population growth, Economic growth, Technological development, Societal attitudes)</p> <p><b>Influencing factors:</b> Four influencing factors were identified in the <i>Great Barrier Reef Outlook Report 2014</i> and recognised in the Reef 2050 Plan as posing the highest risks to the Reef (i.e. risks associated with climate change; land-based run-off, coastal land-use change and direct use of the Great Barrier Reef).</p>	<p><b>Drivers and influencing factors</b> are overarching causes of change in the environment that may act independently but often work in concert with one another and operate across a range of scales. An understanding of their influence is fundamental to understanding the past, present and future condition of the social-ecological system.</p> <p>Work by Allan Dale, Ro Hill, Karen Vella and others demonstrate that governance is a critical driver of change in the Reef system, and thus we propose to add <b>Governance systems</b> to the five listed drivers.</p>
<b>Activities</b>	<p>Reef and catchment activities include the following commercial and non-commercial uses of the Reef and catchment: Agriculture – cane, grazing, dairy, horticulture, grains; Aquaculture; Research; Mining/extractive industries; Urban development and construction; Ports and shipping; Forestry; Marine and coastal recreation; Commercial fishers; Marine and coastal tourism; Traditional Owner use of marine and coastal resources; Non-commercial recreational activities such as boating, diving, fishing, snorkeling; Defence; Illegal fishing.</p>	<p><b>Activities</b> include all commercial and non-commercial use of the Reef and catchment by the people who live in catchment towns, cities and rural areas, and by people who visit the Reef and catchment. These uses collectively influence Reef resilience.</p>
<b>Pressures</b>	<p>The Reef 2050 Plan refers to a specific set of pressures which are listed in the 2014 Great Barrier Reef Outlook Report as ‘threats’.</p>	<p>Potential <b>pressures</b> on the Reef and its catchment can be broadly grouped into human activities resulting from or associated with climate change; catchment run-off; coastal development and associated degradation of coastal ecosystems; and direct use of the system such as tourism; fishing; defence activities; shipping; and traditional use of marine resources.</p>

<sup>11</sup> Great Barrier Reef Marine Park Authority, 2014a. *Great Barrier Reef Region Strategic Assessment: Strategic Assessment Report*. Townsville: the Great Barrier Reef Marine Park Authority.

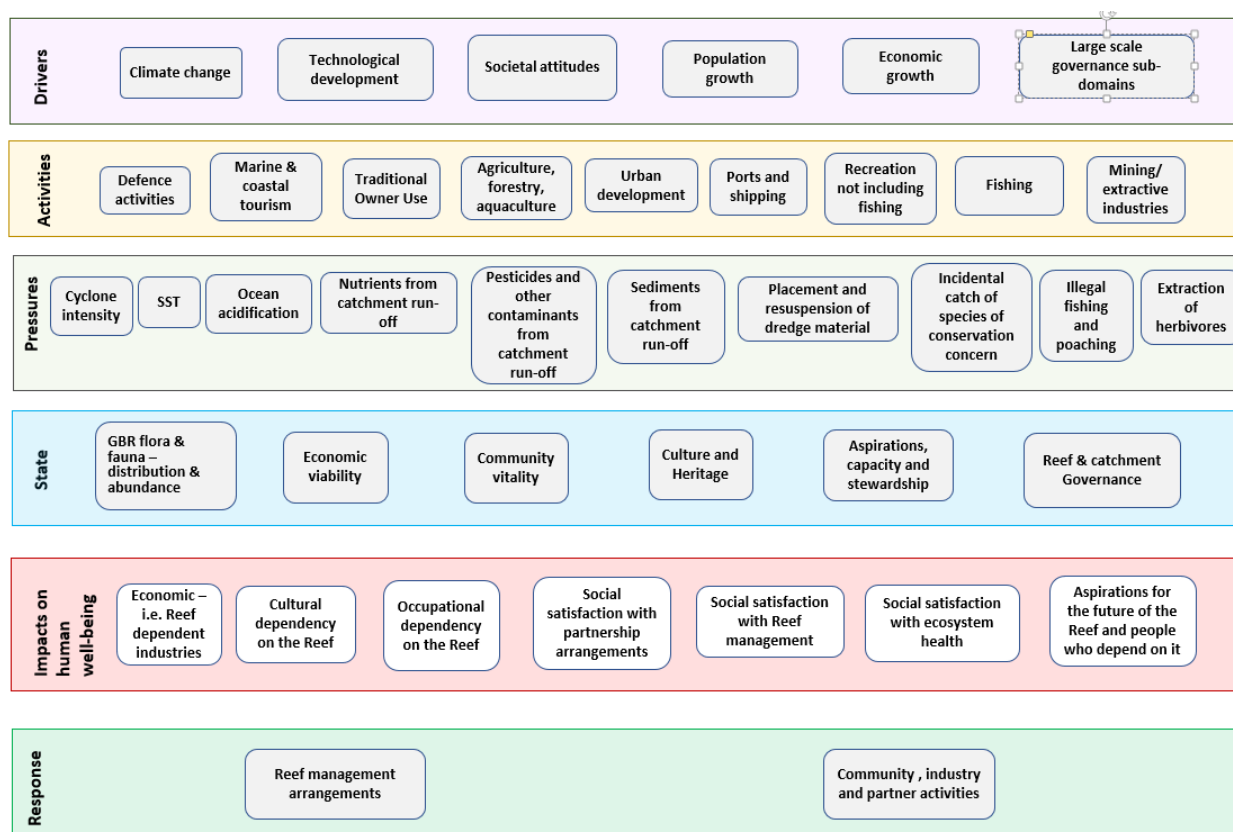
<sup>12</sup> Great Barrier Reef Marine Park Authority, 2014b. *Great Barrier Reef Outlook Report 2014*. Townsville. The Great Barrier Reef Marine Park Authority.

DPSIR elements	Element descriptions	System understanding from the Human Dimensions Expert Group perspective
<b>Impact</b>	Impacts on human wellbeing due to a change in the state of the social-ecological system include impacts on Economic values; Community vitality; Aspirations, capacity and stewardship; Cultural significance; Governance – these are broken down into sets of indicators (indices)	<b>Impacts on human well-being</b> can be described through narratives to understand impacts of change on the well-being of people who use or depend on the Reef. Questions the narratives seek to answer include: <i>What is/are the change process/es? How is change experienced by people who use or depend on the Reef? What are the lines of evidence?</i>
<b>State</b>	Indicator clusters to describe the state of human well-being are based on internationally recognised groupings, derived from social impact assessment literature: economic values; community vitality; aspirations, capacity and stewardship; cultural significance; governance – these are broken down into sets of indicators (indices)	The <b>state</b> of human dimensions can be benchmarked through analysis of evidence pertaining to an agreed set of clusters or themes describing different attributes of human dimensions. Outcomes for Reef 2050 Plan's themes of governance, community benefits, economic benefits and heritage are their desired states, and correspond with four of the five indicator clusters.
<b>Response</b>	<b>Response</b> can be the response of management, communities, partners, industry and other interested stakeholders, and can be developed through collaboration, in light of new and emerging evidence.	Responses can be directed at each component of the DPSIR framework, and include a range of tools and processes to protect and manage the Reef and catchment. <sup>13</sup> There will be opportunities to consider appropriate community and industry responses through regional bench-marking exercises.

Key human dimension elements of the DPSIR framework are summarised in Figure 4. It may be possible to establish causal links if, for example, we work through one pressure (e.g. cyclone intensity) then see how this affects elements of the state and impacts on human well-being, and then develop possible response options. Responses may be through Reef management arrangements, or through collective efforts of communities, industries or partners. Indicating possible pathways of influence and whether these may be positive or negative may help to articulate appropriate responses. By way of example, Figure 5 presents some possible lines of influence due to increased cyclone activity.

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<sup>13</sup> Great Barrier Reef Marine Park Authority, 2014b. *Great Barrier Reef Outlook Report 2014*. Townsville. Great Barrier Reef Marine Park Authority.



**Figure 4. Key human dimension elements of the DPSIR framework<sup>14</sup>**

<sup>14</sup> Anthony, K.A.; Dambacher, J.M.; Walshe, T.; Beeden, R.; (2013) A framework for understanding cumulative impacts, supporting environmental decisions and informing resilience-based management of the Great Barrier Reef World Heritage Area. Great Barrier Reef Marine Park Authority.

Dambacher, J.M.; Hodge, K.B.; Babcock, R.C.; Fulton, E.A.; Apte, S.C.; Plagányi, É.E.; Warne, M.St.J.; Marshall, N.A.; (2013) Models and indicators of Key ecological assets in Gladstone Harbour. A report prepared for the Gladstone Healthy Harbour Partnership. CSIRO Wealth from Oceans Flagship, Hobart. (p.28)

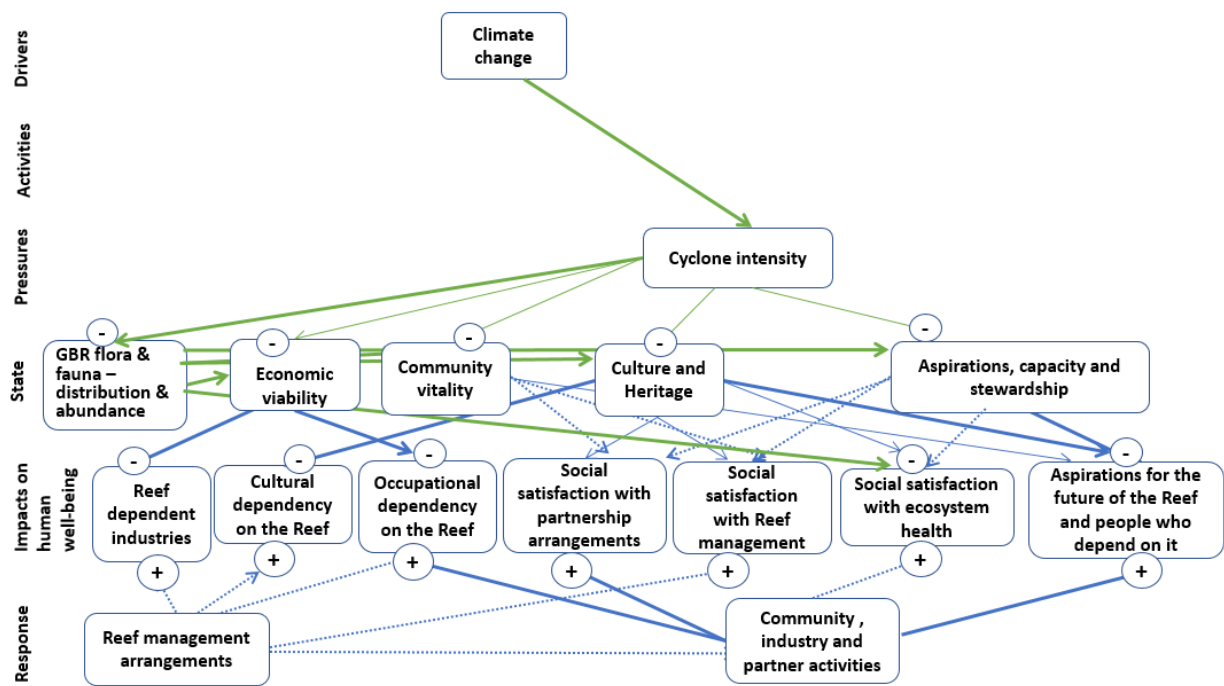
Dale, A., Vella, K., Pressey, B., Brodie, J., Gooch, M., Potts, R., and Eberhart, R. (2016c) Risk analysis of the governance system affecting outcomes in the Great Barrier Reef, *Journal of Environmental Management*.

<http://dx.doi.org/10.1016/j.jenvman.2016.09.013>

Great Barrier Reef Marine Park Authority (2014) Great Barrier Reef Region Strategic Assessment: Strategic assessment report. The Authority, Townsville. (pp. 6-47 to 6-48)

Hedge, P.; Molloy, F.; Sweatman, H.; Hayes, K.; Dambacher, J.; Chandler, J.; Gooch, M.; Chin, A.; Bax, N.; Walshe, T.; (2013) An integrated monitoring framework for the Great Barrier Reef World Heritage Area. Department of the Environment, Canberra. (p. 13)

Marshall, N., Bohensky, E., Curnock, M., Goldberg, J., Gooch, M., Nicotra, B., Pert, P., Scherl, L., Stone-Jovicich, S., Tobin, R. (2016) Advances in Monitoring the Human Dimension of Natural Resource Systems: An example from the Great Barrier Reef. *Environmental Research Letters*. Article reference: ERL-102705



Thickness of lines and size of +/- circle indicative of relative influence. Dotted lines indicate linkages are uncertain or contentious.

Green lines are lines of biophysical influence. Blue lines are lines of human influence.

**Figure 5. Possible lines of influence due to increased cyclone intensity.**

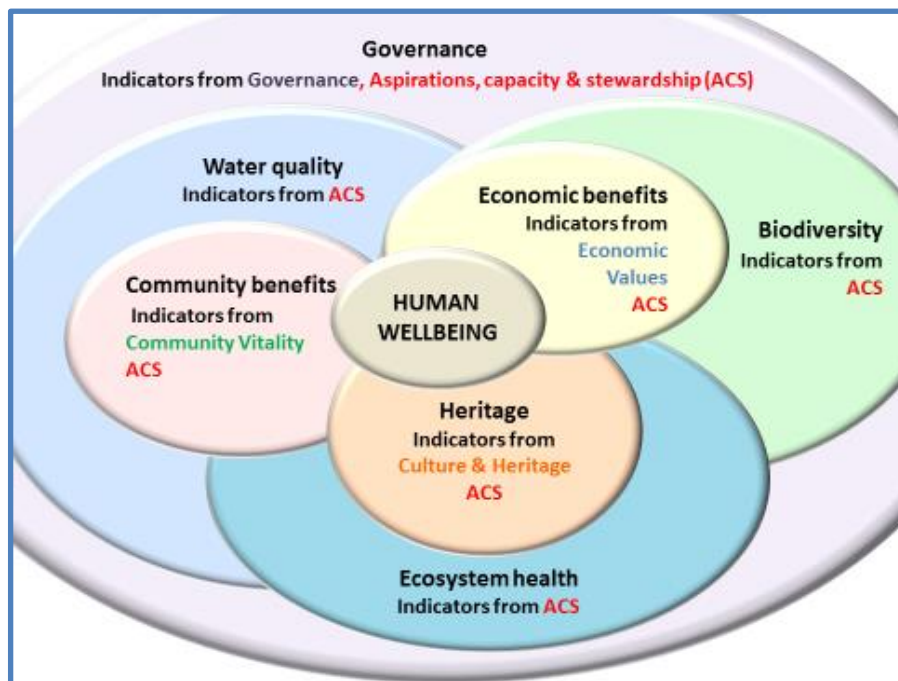
#### 4.0 Suggested sets of indicators (indices) to monitor human dimensions of the Great Barrier Reef

A draft human dimensions indicator framework was constructed and modified from the work by Vella et al. (2012) who defined four main groupings of indicators derived from Social Impact Assessment literature (e.g. Vanclay 1999); social-ecological resilience literature (e.g. Berkes and Folke 1998); and the Millennium Ecosystem Assessment (MEA, 2005), to describe the human dimensions of communities in north Queensland. This framework was applied to an evaluation of social resilience in the Wet Tropics region of the Great Barrier Reef catchment (Dale et al., 2016a). For this project, a fifth cluster was added, *culture and heritage*, based on the cultural significance of the Great Barrier Reef, and its world heritage status. The framework was further modified following Gooch et al. (2017), as described below:

- A review of work by the Intergovernmental Panel on Biodiversity and Ecosystem Services recognising that healthy human systems depend directly or indirectly on a healthy ecosystem (Diaz et al., 2015). The Intergovernmental Panel on Biodiversity and Ecosystem Services and Dale et al. (2016a) frameworks were aligned with values articulated in the Great Barrier Reef Strategic Assessment (the Authority, 2014a); the Great Barrier Reef Outlook Report (the Authority, 2014b); and, published regional report cards for the Reef (Healthy Rivers to Reef Partnership: Mackay Whitsundays, 2016; Fitzroy Partnership for River Health, 2015; and the Gladstone Healthy Harbour Partnership, 2016).



- The five human dimension clusters were mapped against the seven themes of the Reef 2050 Plan (Figure 6) to show their relationship with human well-being, the influence of the governance system, and how they interact to influence both Reef health and human well-being.



**Figure 6. Alignment of human dimension indicator clusters with Reef 2050 Plan themes.**

Initial bench-marking was based on 25 attributes within the five clusters that describe people's relationship with the Reef, i.e. (i) human aspirations, capacities and stewardship; (ii) community vitality related to Reef outcomes; (iii) economic values related to Reef outcomes; (iv) culture and heritage related to the Reef; and; (v) the health of governance systems affecting Reef outcomes. These are shown in Table 5. Taken together these five clusters, their attributes and sets of indicators within each attribute, provide a comprehensive representation of the state of the Reef and catchment's human dimensions, and describe potential impacts on human well-being arising from drivers, activities and pressures on the system.

#### 4.1 Major characteristics of a healthy resilient system

The major characteristics of a healthy resilient system (i.e. the desired state) for the Reef's human dimensions are the following outcomes, as stated in the Reef 2050 Plan:

- Community benefits: An informed community that plays a role in protecting the Reef for the benefits a healthy Reef provides for current and future generations.
- Heritage: Indigenous and non-Indigenous heritage values are identified, protected, conserved and managed so heritage values maintain their significance for current and future generations.
- Governance: The outstanding universal value of the Reef is maintained and enhanced each successive decade via effective governance arrangements/coordinated management activities.

- Economic Benefits: Economic activities within the World Heritage Area and its catchments sustain the Great Barrier Reef's outstanding universal value.



**Table 5. Framework for bench-marking: Great Barrier Reef human dimension clusters, attributes and key indicators and their alignment with Reef 2050 Plan themes.** *NB: Attributes and indicators for which data collection is missing or inadequate are highlighted in red.*

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator sets
<b>All seven themes</b> (i.e., economic benefits, community benefits, heritage, governance, water quality, biodiversity and ecosystem health).	<b>Aspirations, capacity and stewardship (ACS).</b> Cohesive vision and aspirations for the future of the Reef together with awareness, skills, knowledge and capacities to turn aspirations into action. Personal and collective (including industry) efforts to: (a) minimise impacts on the Great Barrier Reef and catchment; (b) restore degraded marine, coastal and catchment ecosystems; (c) apply ecologically sustainable development principles; and (d) be actively involved in Great Barrier Reef and catchment management.	ACS1 Levels of community awareness and education about the Reef	ACS1.1 Regional education/skills levels ACS1.2 Levels of awareness of NRM issues ACS1.3 Levels of awareness of Reef and waterway condition and threats ACS1.4 Number/type of Reef learning opportunities
		ACS2 Community capacity for stewardship	ACS2.1 Sense of responsibility towards the environment ACS2.2 Sense of responsibility towards the Reef and coastal waterways ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities ACS2.4 Numbers and types of Traditional Owner involvement in on-ground Water Quality improvement and monitoring
		ACS3 Adoption of responsible/ best practice – Reef recreational users	ACS3.1 Extent and type of stewardship practices of Reef recreational users ACS3.2 Number of people visiting the Reef ACS3.3 Why people visit the Reef ACS3.4 Where people visit the Reef ACS3.5 What people do in the Reef ACS3.6 How people get to the Reef
		ACS4 Adoption of responsible/ best practice – Agricultural and land sector	ACS4.1 Extent and type of stewardship practices of agricultural industries
		ACS5 Adoption of responsible/ best practice – Industry and urban sector	ACS5.1 Extent and type of stewardship practices of urban councils and industries

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator sets
		ACS6 Adoption of responsible/ best practice – Marine industries	<p>ACS6.1 Extent and type of stewardship practices of Reef-associated industries (e.g. ports and shipping)</p> <p>ACS6.2 Arrangements to ensure shipping in the Reef is safe</p> <p>ACS6.3 Number of shipping accidents in the Reef</p> <p>ACS6.4 Extent to which ports and shipping apply 'best practice' principles</p> <p>ACS6.5 Extent and type of stewardship practices of Reef-based tourism</p> <p>ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing</p>
<b>Community benefits</b> An informed community that plays a role in protecting the Reef for the benefits a healthy Reef provides for current and future generations.	<b>Community Vitality (CV).</b> Characterised by demographic stability, security, happiness and well-being. Community vitality associated with the Reef includes how and why people access, use and value the Reef; services and infrastructure supporting the interface between the community and the Reef; and the social health derived from the Great Barrier Reef, e.g. nature appreciation, relaxation, recreation, physical health benefits, and other lifestyle benefits derived from the Great Barrier Reef. A healthy Reef community derives high levels of appreciation	CV1 Demographic stability across the catchment	<p>CV1.1 Basic demographic characteristics (e.g. population, age structure, migration and growth rates)</p> <p>CV1.2 Migration intentions over the next 12 months</p>
		CV2 Security in the catchment including housing, safety and risk management	<p>CV2.1 Financial distress: (i) delay or cancel non-essential purchases, (ii) could not pay bills on time, (iii) went without meals or unable to heat or cool home, (iv) asked for financial help from friends or family</p> <p>CV2.2 Crime rates</p> <p>CV2.3 Perceptions of safety</p> <p>CV2.4 Housing including availability and affordability</p>
		CV3 Wellbeing/ happiness within the general community	<p>CV3.1 Community wellbeing (1-7): (i) place to live, (ii) coping with challenges, (iii) pride, (iv) optimism, (v) community spirit</p> <p>CV3.2 Decreasing community liveability: (i) liveability, (ii) friendliness, (iii) local economy, (iv) local landscape</p> <p>CV3.3 Personal Wellbeing (0-100). Satisfaction with (i) standard of living, (ii) health, (iii) achievements, (iv) relationships, (v) safety, (vi) feeling part of community, (vii) future security</p> <p>CV3.4 Levels of physical health</p> <p>CV3.5 Levels of mental health</p>
		CV4 Community health/ wellbeing/ satisfaction associated with the Reef	<p>CV4.1 Reef contribution to overall Quality of Life</p> <p>CV4.1.1 Number of Traditional Owner benefit-sharing initiatives</p> <p>CV4.2 Levels of optimism about the future of the Reef</p> <p>CV4.3 Levels of satisfaction with Reef experiences</p> <p>CV4.4 Influences on Reef experiences (negative and positive)</p>

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator sets
	and enjoyment from the Reef and is highly satisfied with the Reef and its management.	CV5 Regional services and service infrastructure supporting the interface between the community and Great Barrier Reef	CV5.1 Energy/water security CV5.2 Quality of infrastructure CV5.3 Impacts on infrastructure CV5.4 Perceptions of access to health, education, aged care and child care CV5.5 Perceptions of access to roads and public transport
<b>Heritage</b> Indigenous and non-Indigenous heritage values are identified, protected, conserved and managed such that the heritage values maintain their significance for current and future generations.	<b>Culture and Heritage (CH).</b> Status of integrated and diverse culture and heritage associated with the Great Barrier Reef catchment. Cultural and heritage connections promote a sense of place associated with Great Barrier Reef coastal communities, and there is a strong sense of place attachment and identity associated with the community, because of its association with the Reef. This cluster also includes values of significance in accordance with Traditional Owner practices, observances, customs, traditions, beliefs or history. Historic heritage is specifically concerned with	CH1 World Heritage – underpinned by ecosystem health, biodiversity and water quality	CH1.1 State of regional natural assets CH1.2 Perceptions of the Reef’s aesthetic beauty CH1.3 Perceived impacts on the Reef’s aesthetic beauty
		CH2 Indigenous (TO) heritage	CH2.1 ID, state and trend of Indigenous heritage values CH2.2 Traditional Owner management of Reef resources including number and strength of (a) Traditional Owner connections with Reef resources incl. identification, protection and management of Indigenous cultural heritage in sea country, (b) Traditional Owner benefits derived from the Reef, (c) partnerships, institutional arrangements and agreements between Traditional Owners and all Reef stakeholders, (d) Traditional Owner-driven frameworks and participatory monitoring methods CH2.3 Levels of Traditional Owner satisfaction with (a) identification, documentation and storage of cultural information, (b) Traditional Owner-led methodologies, (c) participation in Reef management, (d) extent to which Traditional Ecological Knowledge (TEK) is identified, maintained and transferred CH2.4 Levels of Traditional Owner use and dependency on the Reef CH2.5 Impacts on Indigenous heritage
		CH3 Contemporary culture	CH3.1 Place attachment associated with the Reef CH3.2 Identity associated with the Reef CH3.3 Pride in the Reef CH3.4 Personal connection to the Reef CH3.5 Impacts on contemporary culture

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator sets
	the occupation and use of an area since the arrival of European and other migrants. There are 4 major attributes associated with this cluster: natural heritage; Indigenous heritage; contemporary culture; historic cultural heritage.	CH4 Historic maritime heritage	CH4.1 Identification, protection and management of Reef historic maritime heritage CH4.2 Cultural significance of historic maritime heritage values for the Reef CH4.3 Impacts on historic maritime heritage values
<b>Economic Benefits</b> Economic activities within the World Heritage Area and its catchments sustain the Reef's outstanding universal value.	<b>Economic values (EV).</b> Monetary and non-monetary advantages that people derive directly or indirectly from a healthy and well-managed Great Barrier Reef. Fundamental is the premise that economic activities within the World Heritage Area and its catchments are ecologically sustainable. Reef-dependent industries rely on a healthy Reef and include Reef-based commercial fishing, tourism, recreation, research and Traditional Owner use. Reef-associated industries include industries that may	EV1 Size and diversity of regional economic growth	EV1.1 Gross Regional Product EV1.2 Core industries – size and type
		EV2 Economic viability of Reef-associated industries	EV2.1 Economic viability of Mining and minerals EV2.2 Economic viability of Ports and shipping EV2.3 Economic viability of Agriculture EV2.4 Economic viability of Urban industries
		EV3 Economic viability of Reef-dependent industries	EV3.1 Vulnerability of Reef-dependent industries EV3.2 Adaptive capacity of Reef-dependent industries EV3.3 Economic viability of Reef – tourism EV3.4 Economic viability of Reef – commercial fishing
		EV4 Inclusiveness and economic fairness/ equity	EV4.1 Income – personal and household EV4.2 Equity between and within industries/ activities.
		EV5 Workforce participation and employment	EV5.1 Regional employment participation rates and trends EV5.2 Reef-related employment EV5.2.1 No. employment opportunities for Traditional Owners in Reef sea-country management EV5.2.2 No. employment opportunities for Traditional Owners in Reef-based industries

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator sets
	impact on the Great Barrier Reef, but are not economically dependent on Reef health, e.g. shipping, catchment industries such as agriculture, urban development, port development.	EV6. Economic confidence within the region	EV6.1 Regional economic confidence EV6.2 Confidence in Reef industries
<b>Governance</b> The outstanding universal value of the Reef is maintained and enhanced each successive decade through effective governance arrangements and coordinated management activities.	<b>Governance (G).</b> The health of Reef-based decision-making systems (from local to international scales), including levels of connectivity between different parts of the governance system, effective use of diverse knowledge sets and system capacity for effective action. Also includes viability of institutional arrangements; community participation in Reef management; and use of strong principles in planning and management.	G1 Strategic focus of governance system	G1.1 No./ type of opportunities for improved Reef 2050 Plan governance G1.2 No./ severity of system-wide problems for delivery of key Reef 2050 Plan targets
		G2 Connectivity within and between key decision-making institutions and sectors in the system	G2.1 No./ type governance subdomains (or policy areas) that counteract Reef 2050 Plan targets/action G2.2 Status of partnerships, inter-governmental arrangements G2.3 Levels of transparency, ownership, accountability, responsiveness G2.4 Inter-generational equity in Reef-related decision-making G2.5 Intra-generational equity in Reef-related decision-making
		G3 Adaptive governance capacity of key decision making institutions and sectors in the system	G3.1 Levels of integrated strategy development and delivery design G3.2 Support for management G3.3 Confidence in management G3.4 Sectoral/community contributions to decision-making
		G4 Adaptive use and management of integrated knowledge sets in the system.	G4.1 Availability of integrated knowledge sets to decision makers G4.2 Extent to which integrated knowledge sets are used in decision-making G4.3 Management of integrated knowledge sets

## 4.2 Benchmarking to track progress

Tables of evidence were created for each of the attributes and indicator sets (where possible) using the framework presented in Table 5. Evidence was initially gathered through the use of secondary data sets produced and updated on a regular basis by a range of agencies and institutions, for example, the Australian Bureau of Statistics (ABS), the Queensland Government Statistician's Office (QGSO), Tourism Research Australia (TRA) and the Australian Bureau of Agricultural Resources and Economics (ABARE). These data sets provide readily available and up-to-date information for many attributes within each cluster, although some data are not especially pertinent to the Great Barrier Reef. To fill major data gaps, we used fit-for-purpose surveys designed and implemented by the Social and Economic Long-Term Monitoring Program (SELTMP), and evidence provided by regional discussion panel members. A five-point matrix (index scale) was developed to inform benchmarking (rating) of indicator clusters and attributes, using multiple lines of evidence (See Table 6).

**Table 6. Decision rules for assessing human dimensions of regional communities that will influence social, economic and environmental outcomes of relevance to the Great Barrier Reef.**

Index Rating	Decision Rule
5	The regional community <sup>15</sup> will easily manage the Reef sustainably, maintaining or improving their economic and social wellbeing and the health of the Reef over time.
4	The regional community will make reasonable progress on managing the Reef sustainably, at least maintaining but also improving their economic and social wellbeing and the health of the Reef over time.
3	The regional community will suffer some shocks associated with managing the Reef sustainably, taking considerable time and investment to secure their economic and social wellbeing and the health of the Reef over time.
2	The regional community will struggle to manage the Reef sustainably, resulting in declining social and economic wellbeing and ongoing decline in the health of the Reef over time.

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<sup>15</sup> 'Community' includes residents in Great Barrier Reef regional towns and cities as well as national and international people who either have an interest in the Reef or who influence (directly or indirectly) the condition of the Reef including industry sectors, Traditional Owners and government agencies – i.e. local government, state and Commonwealth governments. A thriving, resilient community can anticipate risks and limit impacts while still retaining the same function, structure, purpose, and identity (CARRI, 2013; Walker & Salt, 2006). Sometimes a community may get trapped in an undesirable state, unable to change over time. Being able to understand which attributes of a community need attention is an important first step to overcome stagnation or decline.

The regional community will be unable to manage the Reef sustainably, and their social and economic wellbeing and the health of the Reef will be unlikely to recover over time.

The tables of evidence with their draft scores were taken to six regional discussion panels within the Great Barrier Reef catchment. Two discussion panel meetings were held in Cairns — one focusing on Eastern Cape York and one focusing on the Wet Tropics — and then discussion panels were held in Townsville (focusing on the Burdekin Region), Mackay (focusing on the Mackay-Whitsundays Region), Rockhampton (focusing on the Fitzroy Region) and Bundaberg (focusing on the Burnett-Mary Region). At the panel meetings, local experts were invited to review the tables and proposed attribute scores. Each panel comprised local experts who were selected on the basis of: (i) their experience and knowledge of the Reef from a regional, community, industry (Reef-dependent and Reef-associated industries), or governance perspective; and/or (ii) their involvement in social, economic and/or environmental initiatives which contribute to regional community wellbeing. If an invited person was unable to attend, but could offer a proxy to represent them, then the proxy was accepted. Panel members comprised chairs of the Authority's Local Marine Advisory Committees, Chairs and/or Chief Executive Officers of Natural Resource Management bodies, local government, Regional Development Australia, tourism organisations, commercial fishers, regional healthy waterways partnership members, Traditional Owners, and researchers on the project team. There were usually around 10 people on each panel. Specifically, panel members were invited to appraise evidence about the Great Barrier Reef's human dimensions presented in the tables, add additional knowledge to fill data gaps, and record data gaps and limitations. During the panel discussions, multiple lines of evidence were discussed, then the decision rules (Table 6) were used to adjust draft scores for each attribute. The scores, when considered, were used to make critical judgements on the state or condition of regional community resilience as a way of representing the Great Barrier Reef's human dimensions.

## 5.0 Current Status of the Great Barrier Reef's human dimensions

Results of the six discussion panels are summarised in Table 7. Each score is derived from synthesised evidence pertaining to attributes of the five clusters and based on the Decision Matrix presented in Table 6. Scores are converted to percentages for easy comparison. For detailed reports see Appendices 2-8.

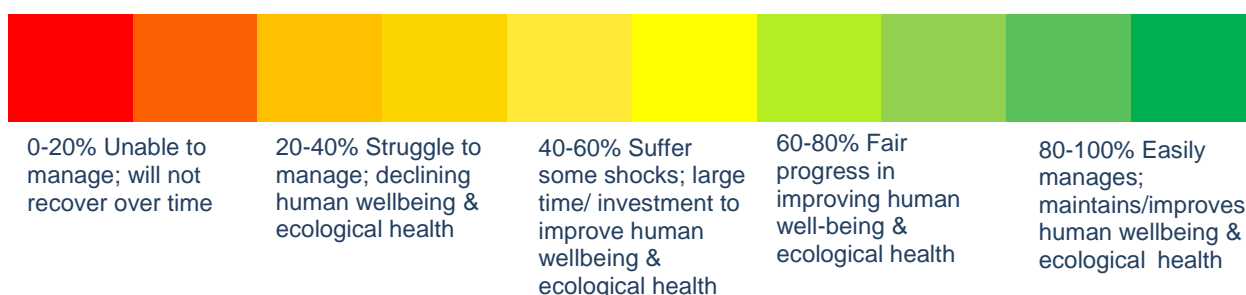
**Table 7. Comparison of regional scores against each of the five human dimension clusters**

	ACS	CV	CH	EV	G
ECY	57% (17/30)	60% (15/25)	55% (11./20)	45% (13.5/30)	52% (10.5./20)
Wet Tropics	67% (20/30)	68% (17/25)	57% (11.5/20)	58% (17.5/30)	57% (11.5./20)
Burdekin	67% (20/30)	64% (16/25)	57% (11.5/20)	58% (17.5/30)	57% (11.5./20)



M-W	70% (21/30)	66% (16.5/25)	60% (12/20)	63% (19/30)	57% (11.5./20)
Fitzroy	67% (20/30)	66% (16.5/25)	62% (12.5/20)	62% (18.5/30)	57% (11.5./20)
B-M	70% (21/30)	66% (16.5/25)	72% (14.5/20)	68% (20.5/30)	67% (13.5/20)

### Key for Table 7



## 5.1 Priority indicators to monitor the Great Barrier Reef's human dimensions

The priority indicators are a sub-set of the key indicator sets listed in Table 5. Table 8 lists all the priority indicators recommended by the NESP Project 3.2.2 team and Human Dimensions Expert Group for monitoring as part of the RIMReP. (The derivation of these are shown in Appendix 10, Table 18). For each indicator, a justification for why the indicator was selected is stated in the table. The justification for each is based on the indicator's capability to:

- Gauge potential contributions to Reef stewardship and resilience
- Gauge actual contributions to Reef stewardship
- Potential social resilience
- Describe the status of key processes
- Measure pressures influencing the system, and impacts on human wellbeing
- Attribute causes of change in state
- Enhance capability to predict future states
- Contribute explanatory data/information across themes
- Ensure continuity of historical data sets and build on existing programs
- Provide tactical information for management (i.e. informs incident assessment and/or response)
- Provide operational information for management (i.e. informs actions, assessments, decisions)
- Indicate the effectiveness of management actions/responses



- Contribute to reporting and strategic planning (trends, cause-effect)

**Table 8. Justification for priority indicators**

<b>Priority Indicator</b>	<b>Justification for selection</b>
ACS1.3 Levels of awareness of threats to the Reef and its catchment	Provide tactical information for management; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
ACS2.2 Sense of responsibility towards the Reef and catchment waterways	Provide tactical information for management; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities	Gauge actual contributions to stewardship; Provide tactical information for management; Attribute causes of change in state; Ensure continuity of historical data sets and build on existing programs; Provide operational information for management; Contribute to reporting and strategic planning
ACS2.4 Numbers and types of Traditional Owners, industries and communities engaged in on-ground water quality improvement and monitoring	Gauge actual contributions of this group/sector to stewardship; Provide tactical information for management; Attribute causes of change in state; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
ACS3.1 Extent and type of stewardship practices of Reef recreational users	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
ACS3.2 Number of people visiting the Reef	Provide tactical information for management; Attribute causes of change in state; Provide operational information for management; Contribute to reporting and strategic planning
ACS3.3 Why people visit the Reef	Describe the status of key processes; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
ACS3.4 Where people go in the Reef	Provide tactical information for management; Attribute causes of change in state; Provide operational information for management; Contribute to reporting and strategic planning
ACS3.5 What people do in the Reef	Provide tactical information for management; Attribute causes of change in state; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
ACS3.6 How people get to the Reef	Provide tactical information for management; Attribute causes of change in state; Provide operational information for management; Contribute to reporting and strategic planning

Priority Indicator	Justification for selection
ACS4.1 Extent and type of stewardship practices of ag. industries	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Contribute explanatory data/information across themes; Ensure continuity of historical data sets and build on existing programs; Provide operational information for management; Contribute to reporting and strategic planning
ACS5.1 Extent and type of stewardship practices of urban councils and industries	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
ACS6.1 Extent and type of stewardship practices of Reef-associated industries	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
ACS6.2 Arrangements to ensure shipping in the Reef is safe.	Attribute causes of change in state; Enhance capability to predict future states; Provide operational information for management; Contribute to reporting and strategic planning
ACS6.3 Number of shipping accidents	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Provide operational information for management; Contribute to reporting and strategic planning
ACS6.4 Extent to which ports and shipping apply 'best practice' principles	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Provide operational information for management; Contribute to reporting and strategic planning
ACS6.5 Extent and type of stewardship practices of Reef-based tourism	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Enhance capability to predict future states; Ensure continuity of historical data sets and build on existing programs; Provide operational information for management; Contribute to reporting and strategic planning
ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Enhance capability to predict future states; Ensure continuity of historical data sets and build on existing programs; Provide operational information for management; Contribute to reporting and strategic planning
CV4.1 Reef contribution to overall Quality of Life	Describe the status of key processes; Attribute causes of change in state; Contribute explanatory data/information across themes
CV4.1.1 Number of Traditional Owner benefit sharing initiatives	Gauge actual contributions of this group/sector to stewardship; Attribute causes of change in state; Enhance capability to predict future states; Provide operational information for management; Contribute to reporting and strategic planning
CV4.2 Levels of optimism about the future of the Reef	Describe the status of key processes; Attribute causes of change in state; Contribute explanatory data/information across themes

Priority Indicator	Justification for selection
CV4.3 Levels of satisfaction with Reef experiences	Describe the status of key processes; Attribute causes of change in state; Contribute explanatory data/information across themes
CV4.4 Influences on Reef experiences (negative and positive)	Describe the status of key processes; Attribute causes of change in state; Contribute explanatory data/information across themes
CH1.2 Perceptions of the Reef's aesthetic beauty	Provide tactical information for management; Attribute causes of change in state; Provide operational information for management
CH1.3 Perceived impacts on the Reef's aesthetic beauty	Provide tactical information for management; Attribute causes of change in state; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
CH2.1 Identification, state and trend of Indigenous heritage values.	Provide tactical information for management; Describe the status of key processes; Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
CH2.2 Number and strength of (a) Traditional Owner connections with Reef resources including identification, protection and management of Indigenous cultural heritage in sea country; (b) Traditional Owner benefits from the Reef; (c) partnerships, institutional arrangements and agreements between Traditional Owners and all Reef stakeholders; (d) Traditional Owner-driven frameworks and participatory monitoring methods.	Provide tactical information for management; Describe the status of key processes; Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
CH2.3 Levels of Traditional Owner satisfaction with: (a) Identification, documentation and storage of cultural information; (b) Traditional Owner-led methodologies; (c) participation in Reef management; (d) extent to which Traditional Ecological Knowledge is identified, maintained and transferred	Describe the status of key processes; Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
CH3.1 Place attachment associated with the Reef	Contribute explanatory data/information across themes; Contribute to reporting and strategic planning; potential social resilience; Indicate effectiveness of management actions/ responses;
CH3.2 Identity associated with the Reef	Contribute explanatory data/information across themes; Contribute to reporting and strategic planning; potential social resilience; Indicate effectiveness of management actions/ responses;

Priority Indicator	Justification for selection
CH3.3 Pride in the Reef	Contribute explanatory data/information across themes; Contribute to reporting and strategic planning; potential social resilience; Indicate effectiveness of management actions/ responses;
CH3.4 Personal connection to the Reef	Contribute explanatory data/information across themes; Contribute to reporting and strategic planning; potential social resilience; Indicate effectiveness of management actions/ responses;
CH4.1 Identification, protection and management of the Reef's historic maritime heritage	Enhance capability to predict future states; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
EV3.1 Vulnerability of Reef-dependent industries	Describe the status of key processes; Measure pressures influencing the system, and impacts on human wellbeing; Attribute causes of change in state; Contribute explanatory data/information across themes; potential social resilience
EV3.2 Adaptive capacity of Reef-dependent industries	Describe the status of key processes; Measure pressures influencing the system, and impacts on human wellbeing; Attribute causes of change in state; Contribute explanatory data/information across themes; potential social resilience
EV3.3 Economic viability of Reef-tourism	Contribute explanatory data/information across themes; Ensure continuity of historical data sets and build on existing programs; Contribute to reporting and strategic planning; potential social resilience
EV3.4 Economic viability of Reef-commercial fishing	Contribute explanatory data/information across themes; Ensure continuity of historical data sets and build on existing programs; Contribute to reporting and strategic planning; potential social resilience
EV5.2 Reef-related employment	Measure pressures influencing the system, and impacts on human wellbeing; Contribute explanatory data/information across themes; potential social resilience
EV5.2.1 Number of employment opportunities for Traditional Owners in sea-country management	Measure pressures influencing the system, and impacts on human wellbeing; Contribute explanatory data/information across themes; potential social resilience
EV5.2.2 Number of employment opportunities for Traditional Owners in Reef-based industries.	Measure pressures influencing the system, and impacts on human wellbeing; Contribute explanatory data/information across themes; potential social resilience
G1.1 Number and type of opportunities for improved Reef 2050 Plan Governance	Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
G1.2 Number and severity of system-wide problems for delivery of key Reef 2050 Plan targets.	Describe the status of key processes; Measure pressures influencing the system, and impacts on human wellbeing; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
G2.1 Number and type governance subdomains (or	Describe the status of key processes; Measure pressures influencing the system, and impacts on human wellbeing; Contribute explanatory data/information across themes;

<b>Priority Indicator</b>	<b>Justification for selection</b>
policy areas) that counteract Reef 2050 Plan targets/action	Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
G2.2 Status of partnerships, inter-governmental arrangements	Describe the status of key processes; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
G3.2 Support for management	Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
G3.3 Confidence in management	Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
G3.4 Sectoral/community contributions to decision-making	Describe the status of key processes; Contribute explanatory data/information across themes; Provide operational information for management; Indicate effectiveness of management actions/ responses; Contribute to reporting and strategic planning
G4.1 Availability of integrated knowledge sets to decision-makers	Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
G4.2 Extent to which integrated knowledge sets are used in decision-making	Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning
G4.3 Management of integrated knowledge sets	Enhance capability to predict future states; Contribute explanatory data/information across themes; Provide operational information for management; Contribute to reporting and strategic planning

## 6.0 Evaluation of the adequacy of current monitoring of the Great Barrier Reef's human dimensions

### 6.1 Synopsis of existing monitoring programs

The 25 attributes listed in Table 5 contain the priority indicator sets needed to monitor the Reef's human dimensions. Evidence needed to benchmark progress towards outcomes, objectives and targets in the Reef 2050 Plan are mostly derived from available secondary data sets – i.e. data collected by several different organisations and government agencies, which are updated on a regular basis. However, very few of these data sets are specific to the Reef, resulting in coarse (as opposed to fine) lines of evidence. The exception to this is the Social and Economic Long-Term Monitoring Program for the Reef (SELTMP). At the time of RIMReP's inception, over 100 different biophysical monitoring activities were in place across the Reef (Addison et al., 2015). Only one pre-existing program (the Social and Economic Long-Term Monitoring Program (SELTMP)) was in place for monitoring the human dimensions of the Reef, designed and implemented from 2011 to 2014 (Marshall et al., 2016). No broad monitoring programs currently exist for other human dimension indicators with a Reef focus. No program yet exists, for example, for monitoring Traditional Owner dimensions of the Reef that reflect their own knowledge systems and world-views. Indeed, Addison et al., 2015 (p. 2) note:

*'The most striking gap in socio-economic monitoring is the absence of dedicated and coordinated monitoring pertaining to Traditional Owner use, dependency and well-being.'*

#### 6.1.1 A brief description of Social and Economic Long-Term Monitoring Program

In 2011, the Social and Economic Long-Term Monitoring Program (SELTMP) for the Great Barrier Reef was initiated through funding from the National Environment Research Program (NERP). The SELTMP was established to represent the current status and condition of the major user groups of the Reef with the potential to simultaneously consider trends, interconnections, conflicts, dependencies and vulnerabilities. The baseline dataset was collected in 2013 (SELTMP 2013), and data were collected through secondary datasets where possible. New datasets were created to fill data gaps using standard survey techniques. Baseline results from SELTMP surveys were obtained from 210 commercial fishers and 119 marine-based tourism operators using telephone techniques, 2,877 tourists and 3,181 local residents using face-to-face techniques, and 2,002 other Australians across the country using online facilities (Marshall et al., 2013). SELTMP 2013 described important social and economic components of the Reef system and represented unprecedented insights into the ways in which people use and depend on the Great Barrier Reef, the benefits that they derive, and how they perceive, value and relate to the Reef and each other.

The design of the SELTMP 2013 was highly collaborative and based on latest scientific developments, which meant that data was cutting-edge, information could be well-translated into knowledge and could directly feed into management processes. A high level steering committee of six members was established to ensure that that RIMReP was policy relevant and true to its contractual commitments yet sufficiently flexible to deliver on stakeholder needs. The

steering committee met twice a year and was chaired by a representative from the Authority, who was a key end user of the SELTMP data. Additionally, a Scientific and Stakeholder Advisory Panel was established comprising 22 representative members across community, government, research and industry. The purpose of the Panel was to engage high level potential end-users of the research and maximise the relevance of the SELTMP to the broad range of stakeholders in the region. Thirdly, technical working groups for each of the major sectors of commercial fishing, marine tourism, coastal communities, recreation, and ports and shipping as well as technical working groups to advise on cross-cutting issues of drivers of change and wellbeing were established. The seven working groups comprised technical experts from community, government, research and industry. The groups met regularly but less formally, as agreed on by group members. Some groups comprised only a small number of members (e.g. four people in the Ports and Shipping working group), whilst others comprised larger numbers (e.g. 25 people in the Tourism working group). During the initial meetings, the groups were encouraged to highlight their own internal issues and priorities and discuss how the availability of social and economic data might be useful. Trust and effective relationships within each group were important to establish (Marshall et al., 2013).

The formal monitoring framework was based on the DPSIR model (Drivers – Pressures – State – Impact – Response) that founded the Millennium Ecosystem Assessment. Indicator groups in the SELTMP were categorised as; (i) resource use and dependency, (ii) ecosystem benefits and well-being, and (iii) drivers of change (indirect and direct drivers). The adapted SELTMP framework enabled data needs and gaps to be identified, and guided the process to decide which indicators selected by the advisory panels would be most informative and feasible to monitor. Data representing each indicator group was provided either through existing regional datasets (secondary data), or through survey work (primary data). Working group members were asked to assist SELTMP staff to identify and access existing datasets. In sum, the SELTMP research team worked to deliver data that represented the human dimension of the region as determined by a 'top down' scientific framework and by a 'bottom up' participatory process (Marshall et al., 2013).

In 2017, CSIRO was commissioned by the Great Barrier Reef Marine Park Authority (the Authority) to collect and interpret a second data point for the SELTMP. In this instance, data were to be integrated into RIMReP. The aim was to produce a SELTMP that was robust through time whilst also adaptive to changing needs and new insights. Some minor modifications were made to the SELTMP survey based on gaps identified through the assessment framework. Some questions became redundant in the SELTMP 2013 survey, and some new survey questions were identified and included. The survey changes were developed in collaboration with the Authority, industry, and each of the natural resource management groups. This latest survey has provided more in-depth information about (i) resource use and resource user profiles, (ii) sources of environmental information and levels of trust associated with each potential sources, (iii) perceptions of management of creeks and other freshwater systems entering the lagoon, and (iv) a broader range of held values associated with the Reef. There have not been any major differences in the methodological approach between 2013 and 2017, and the majority of data across the years should be comparable where survey questions have remained the same through time.

## 7.0 Adequacy of existing monitoring programs

### 7.1 Adequacy of the Social and Economic Long-Term Monitoring Program

The SELTMP data are the only social data that are collected consistently for the Great Barrier Reef and its catchment. For this reason, we believe it to be critically important for the assessment and monitoring of the human dimensions of the RIMReP. The SELTMP surveys collect a range of attitudinal data from coastal residents and Reef visitors between Cooktown and Bundaberg, noting limitations in data collection north of Cairns, which could be addressed in future depending on resourcing.

**Table 9. Alignment of SELTMP survey questions with the indicator clusters developed for the RIMReP.**

Human Dimension Cluster	Attribute	Survey questions
1. Aspirations, capacity and stewardship	Aspirations (ACS1)	<ul style="list-style-type: none"> <li>• I would like to do more to help protect the Reef</li> <li>• I would like to do more to improve water quality in the waterways in my region</li> </ul>
	Capacity and education (ASC2)	<ul style="list-style-type: none"> <li>• I feel like I can contribute to Reef management</li> <li>• I have the necessary knowledge and skills to reduce any impact that I have on the Reef</li> <li>• I cannot make a personal difference in improving the health of the Reef</li> <li>• I do not have the time or opportunity required to reduce any impact that I might have on the Reef</li> <li>• I am not worried about climate change impacts on the Reef</li> <li>• Climate change is an immediate threat requiring urgent attention</li> <li>• What do you think are the three (3) most serious threats to the Reef?</li> <li>• Do you have university or TAFE education?</li> </ul>
	Stewardship (ACS3)	<ul style="list-style-type: none"> <li>• I make every effort to use energy efficiently in my home and workplace</li> <li>• I re-use or recycle most goods and waste</li> <li>• I rarely consider the environmental impact of the production process for goods and services that I purchase</li> <li>• I don't usually make any extra effort to reduce the waste that I generate</li> <li>• It is not my responsibility to protect the Reef</li> <li>• I feel a social expectation to reduce any impact that I might have on the Reef</li> <li>• Are you part of a Reef-based club or community group such as a spear-fishing club in your region? a. If yes: Name</li> <li>• b. Are you part of an environmental community based group? Name</li> </ul>



2. Community vitality	Community health (CV3)	<ul style="list-style-type: none"> <li>• I value the Reef because it makes me feel better physically and/or mentally</li> <li>• I would not be personally affected if the health of the Reef declined</li> <li>• Thinking about coral bleaching makes me feel depressed</li> </ul>
	Satisfaction (CV4)	<ul style="list-style-type: none"> <li>• The freshwater areas (e.g. rivers, creeks) in my region are not in good condition</li> <li>• The coral Reefs in my region are in good condition</li> <li>• There is too much rubbish (plastics and bottles) on the beaches in my region</li> <li>• I am worried about the status of freshwater fish in region</li> <li>• The mangroves in my region are in good health</li> <li>• The estuarine and marine fish in my region are in good condition</li> <li>• I like the colour clarity of water along the beaches in my region.</li> </ul>
	Wellbeing (CV3)	<ul style="list-style-type: none"> <li>• The Reef contributes to my quality of life and wellbeing</li> <li>• I feel optimistic about the future of the Reef</li> <li>• I love that I live beside the Reef</li> <li>• I live in this region because of the Reef</li> </ul>
	Relationship with the Reef (CV3)	<ul style="list-style-type: none"> <li>• What are the first words that come to mind when you think of the Great Barrier Reef?</li> </ul>
	Resource use and resource user profiles  (Different for tourists and residents) (ACS3)	<ul style="list-style-type: none"> <li>• Have you ever visited the Great Barrier Reef? (including all land and water from the beaches on the coast, the bays and creeks, the islands, the shoals and seafloor, the open waters, and of course the coral Reefs)</li> <li>• In the previous 12 months, how many days did you visit the Reef for recreation?</li> <li>• Thinking about all of your visits to the Reef in the last 12 months, what proportion of your time was spent at each of the following Reef environments</li> <li>• When visiting the Reef, how far do you normally travel from your home?</li> <li>• When visiting the Reef in the last 12 months, how often did you travel by...own boat etc.</li> <li>• Thinking about all your Reef visits in the past 12 months, please rate the importance of the following activities to your use and enjoyment of the Reef (18 activities listed):</li> <li>• Thinking about the entire Reef area, would you be able to identify your favourite place? What is the name of this favourite place?</li> </ul>
3. Culture and Heritage	Values (CH1) (CH3) (CH4)	<ul style="list-style-type: none"> <li>• I feel proud that the Reef is a World Heritage Area</li> <li>• The Reef is part of my identity</li> <li>• The Reef is an important part of my culture</li> <li>• The Reef is a great asset for the economy of the region</li> <li>• I value the Reef because it supports a variety of life, such as fish and corals</li> <li>• The aesthetic beauty of the Reef is outstanding</li> <li>• The Reef supports a desirable and active way of life</li> <li>• I value the Reef for the fresh seafood it provides</li> <li>• I value the Reef because it attracts people from all over the world</li> <li>• I value the Reef because of its rich traditional owner heritage</li> </ul>

		<ul style="list-style-type: none"> <li>• I value the Reef because it provides a place where people can continue to pass down wisdom, traditions and a way of life</li> <li>• I value the Reef because we can learn about the environment through scientific discoveries</li> <li>• The Reef inspires me in artistic or thoughtful ways</li> <li>• I value the Reef because it is spiritually important to me</li> <li>• I value the Reef because it exists, even if I don't benefit from it</li> </ul>
4. Economic value	Economic values (EV1) (EV3) (EV4) (EV5) (EV6)	<p>ONLY FOR: commercial fisher and marine tourism operator surveys</p> <ul style="list-style-type: none"> <li>• How long have you been involved in the Reef tourism industry?</li> <li>• How long has your current business been operating?</li> <li>• What proportion of your household income came from tourism in the last financial year?</li> <li>• How many employees (FTE) did your operation employ over the previous 12 months?</li> <li>• Do you have insurance for your business assets?</li> <li>• Could you please indicate (approximately) your business turnover (entire revenue) for the past 12 months, in broad categories?</li> </ul>
5. Governance	Confidence in management (G3)	<ul style="list-style-type: none"> <li>• Enough is being done to effectively manage the Reef</li> <li>• I am confident that the Reef is well managed</li> <li>• I feel confident that the freshwater areas in my region are well managed</li> <li>• I can contribute to Reef management</li> </ul>
	Equity issues (G2)	<ul style="list-style-type: none"> <li>• I do not have fair access to the Reef compared to other user groups</li> <li>• Future generations have been adequately considered in the management of the Reef</li> </ul>
	Support for management (G3)	<ul style="list-style-type: none"> <li>• I support the rules and regulations that affect access and use of the Reef</li> <li>• I support the current rules and regulations that affect access and use of freshwater areas (rivers and creeks in my region)</li> </ul>
	Traditional vs. progressive (G2)	<ul style="list-style-type: none"> <li>• 'Progressive' rather than, 'traditional' on a ten point scale with traditional at one end, and progressive at the other.</li> </ul>
	Trust in networks (G4)	<ul style="list-style-type: none"> <li>• On a scale of 1-10, how much do you trust the information you receive about the Reef from the following groups? (11 listed)</li> </ul>
	Sources of Information (G4)	<ul style="list-style-type: none"> <li>• On a scale of 1-10, how much do you rely on each of the following for news about your region and the world? (16 listed)</li> </ul>

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Demographic	• In what year were you born?
Information	• What is your current home postcode?
(CV1) (ACS1)	• Are you currently married or have a partner?
	• Do you have university or TAFE education?

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## 7.2 Adequacy of other (secondary) data sets

In addition to data derived from the SELTMP, data sources that could be used for assessing each of the indicators and attributes in the framework were compiled from peer-reviewed literature, grey literature and other forms of knowledge such as Indigenous and local knowledge. The following secondary datasets were used extensively in the 2017 human dimensions regional benchmarking reports (See Appendices 2-8). Most data sets were relevant at either Local Government Area scale, however, Reef-specific data are very hard to extract. Further, data sets pertaining to Eastern Cape York were either not available at all or difficult to obtain.

- **ABS** (Australian Bureau of Statistics) *Data by Region*  
<http://stat.abs.gov.au/itt/r.jsp?databyregion>
- **ABS** Australian Bureau of Statistics. (2017). *4680.0 - Experimental Environmental-Economic Accounts for the Great Barrier Reef, 2017* Retrieved from:  
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4680.0Main+Features12017>
- **ABS** (Australian Bureau of Statistics). *ABS Census Data*. Retrieved:  
<http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Census?opendocumentandref=topBar>
- **ABS** (Australian Bureau of Statistics). 4609.0.55.003 - *Land Account: Queensland, Experimental Estimates, 2011 – 2016*. *Land Account: Queensland, Experimental Estimates, 2011-2016*,
- **ABS** (Australian Bureau of Statistics) – Community profiles  
<http://www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles>
- **ABARES** (Australian Bureau of Agricultural and Resource Economics and Sciences) *Catchment Scale Land Use of Australia*  
[http://www.agriculture.gov.au/abares/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb\\_luAusg9abll20160616\\_11a.xml](http://www.agriculture.gov.au/abares/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_luAusg9abll20160616_11a.xml)
- **ABARES** (Australian Bureau of Agricultural and Resource Economics and Sciences) *Data sets*. <http://www.agriculture.gov.au/abares/data>
- **AMSA** commercial vessel registration data
- **The Authority** *Vessel registration levels for the Great Barrier Reef catchment area*.
- **The Authority** *Environmental Management Charge (EMC) data*
- **QGSO** (Queensland Government Statistician's Office). *Queensland regional profiles*  
<http://statistics.qgso.qld.gov.au/>
- **QDAFF** - State recreational fishing survey
- **Rental Vulnerability Index** <https://cityfutures.be.unsw.edu.au/cityviz/rental-vulnerability-index/>
- **SELTMP** *The Social and Economic Long-Term Monitoring Program for the Great Barrier Reef* <http://seltmp.eatlas.org.au/seltmp>

- **TRA** (Tourism Research Australia) <https://www.tra.gov.au/>
- **University of Canberra** (2017) *2016 Regional Wellbeing Survey: Results by RDA and LGA*. <http://www.regionalwellbeing.org.au/>

NESP Project 3.2.2 identified several other data sets, and reviewed the adequacy/suitability of each to achieve the objectives and requirements of the RIMReP, including information requirements for the Outlook Report, Reef 2050 Plan, Regional Report Cards and other mandatory reporting requirements and other information requirements of Reef users. The results of the review are presented in Appendix 9. Adequacy of the spatial and temporal (periodicity) scales of available data sets is rated as High (H), Medium (M) or Low (L), and shown in the table in Appendix 9. The table also identifies the host organisation, data type (numeric, spatial, rich text); and data format (excel, PDF, raster).

### 7.3 Gaps in current monitoring effort

The NESP 3.2.2 project team developed a spreadsheet aligning potential indicators against Reef 2050 Plan targets, objectives and outcomes. This highlighted sources of existing data, and data gaps pertinent to the Great Barrier Reef's human dimensions. The process revealed several readily available data sets for assessment, but also a number of critical data gaps. (See Appendix 10). The gap analysis identified some attributes of human dimensions which are underrepresented in the Reef 2050 Plan. For example, there is no specific reference in the Plan to the adoption of responsible practices by recreational/artisanal users of the Great Barrier Reef, yet an estimated four million people visit/use the Reef each year (Deloitte Access Economics, 2017), and data suggest that Reef visitors are willing to adopt new practices to protect the Reef (Marshall et al., 2016). Similarly, there is no consideration of major strategies to improve the economic resilience of communities seriously affected by the impacts of coral bleaching and extreme weather events likely caused by climate change, even though such events can be financially damaging, especially for Reef-dependent industries (Marshall et al., 2013).

## 8.0 New technologies for monitoring the Great Barrier Reef's human dimensions

Using new computing technologies and a 'Big Data' concept provides considerable potential for larger scale, faster and cost-effective monitoring. Using publicly available data for the purpose of socio-economic or environmental monitoring may help to transition from traditional data collection methods to more integrated hybrid systems. Hybrid data systems can then focus data collection efforts on those areas that require specific and high quality data, and complement them with higher volume but potentially less specific data sets that provide insights into trends (especially fast changing) and patterns that may remain unrecognised otherwise. This huge volume and variety of data coupled with data analytics, artificial intelligence, machine and deep learning allows for automation of processes. For example, automated identification of species or attributes in video footage; reducing the cost of manual coding. This new concept has the potential to gradually replace existing methods for data collection, particularly once when methods that extract information from higher volume but potentially less specific data are calibrated with high quality data. Work on this new concept specifically with regard to collection of diverse high volume less specific data (such as social media, open data), extraction of valuable information with Big Data analytics and calibration based on initial findings are very promising for monitoring human dimensions of the Reef.

## 9.0 Recommendations for integrated monitoring of the Great Barrier Reef's human dimensions

Though the gap analysis, the Human Dimensions Expert Group identified data sources, programs and activities which are **critical** for the successful assessment and monitoring of the Great Barrier Reef's human dimensions, and which need to be fully funded into the future. Use of free and readily available data sets together with a combination of the following monitoring programs and activities are seen as core to meeting human dimensions targets, objectives and outcomes articulated in the Reef 2050 Plan, and for addressing significant gaps.

- Attitudinal surveys of residents, visitors, Traditional Owners, national and international stakeholders
- Economic dependency on the Great Barrier Reef
- Use and visitation patterns
- Non-market valuations
- Recreational fishing effort
- Aesthetics monitoring
- Traditional Owner-led indicators
- Indigenous cultural heritage places
- Historic maritime heritage
- Media tracking and analysis
- Stewardship and behaviour change
- Long-term human dimensions benchmarking
- Governance benchmarking

## 10.0 Recommendations for monitoring design

Over the past twelve months the human dimensions team have identified:

- i. The priority indicators – see Table 18 in Appendix 10 for the complete list
- ii. The methods by which the indicator **should** be measured
- iii. The **locations** at which the indicator should be measured (presented as a map)
- iv. The **frequency** with which the indicator should be measured, which may vary from site to site

These recommendations are summarised in Table 10. The team has also described how the indicator framework has been designed to chart progress of the Reef 2050-themed outcomes, objectives and targets, and can be used to address management needs (refer to Tables 2 and 5).

**Table 10. Summary of Great Barrier Reef human dimensions monitoring program including priority indicators, data collection method, frequency and scale.**

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
Assessment of each human dimensions indicator	Collaborative assessment of each indicator using expert discussion panels and drawing on multiple lines of evidence derived from primary and secondary data	NRM region – can be scaled up or down	Annual for 2-3 years, then once every 2 years	Not yet funded; Trialed through NESP Project 3.2.2
ACS1.3 Levels of awareness of threats to the Reef and its catchment	SELTMP face-to-face	NRM region, whole Reef catchment; national	Every 2 years, and after major event	Ad-hoc funding at present
	Media tracking and analysis	NRM region, whole Reef catchment; national	Annual	Not yet funded
	Big data analytics	NRM region, whole Reef catchment; national, international	Near real-time	New Initiative Not yet funded
ACS2.2 Sense of responsibility towards the Reef and catchment waterways	SELTMP face-to-face	NRM region, whole Reef catchment	Every 2 years, and after major event	Ad-hoc funding at present
ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities	Monitor and evaluate practice change through the Paddock to Reef program	NRM region, whole Reef catchment; whole GBRMP	TBA	
ACS2.4 Numbers and types of Traditional Owners, industries and communities engaged in on-ground water quality	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, whole Reef catchment; whole GBRMP	Every 2 years	New Initiative Not yet funded

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
improvement and monitoring	Monitor and evaluate practice change through the Paddock to Reef program and other relevant projects	NRM region, whole Reef catchment;	TBA	
ACS3.1 Extent and type of stewardship practices of Reef recreational users	InfoFish surveys	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	Site-specific data requires extra resources
	Possibly QDAF Recreational Fishing survey	Whole GBRMP- boat ramps	Every 2 years, and after major event	Site-specific data requires extra resources
	Extend the Paddock to Reef program to include monitoring of marine debris in the GBRMP and waterways	NRM region, whole Reef catchment; whole GBRMP	TBA	
	Ongoing evaluation of extension and education approaches		TBA	New initiative Not yet funded
ACS3.2 Number of people visiting the Reef	Big Data analytics	Whole GBRMP	Near real-time	New Initiative Not yet funded
ACS3.3 Why people visit the Reef	SELTMP face-to-face	Whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	QDAF Recreational Fishing survey	Whole GBRMP- boat ramps	Every 2 years, and after major event	Site-specific data requires extra resources
ACS3.4 Where people go in the Reef	SELTMP face-to-face	Whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present



Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
	QDAF Recreational Fishing survey	Whole GBRMP – boat ramps	Every 2 years, and after major event	Site-specific data requires extra resources
	GU Big Data analytics	Whole GBRMP	Near real-time	New Initiative Not yet funded
ACS3.5 What people do in the Reef	SELTMP face-to-face	Whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	GU Big Data analytics	Whole GBRMP	Near real-time	New Initiative Not yet funded
	Possibly InfoFish	Whole GBRMP	TBA	Site-specific data requires extra resources
	QDAF Recreational Fishing survey	Whole GBRMP- boat ramps	Every 2 years, and after major event	Site-specific data requires extra resources
	CQU Recreation Index	Whole GBRMP		New Initiative Not yet funded
ACS3.6 How people get to the Reef	SELTMP face-to-face	Whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	GU Big Data analytics	Whole GBRMP	Near real-time	New Initiative Not yet funded
	CQU Recreation Index	Whole GBRMP	Every 2 years	New Initiative Not yet funded
ACS4.1 Extent and type of stewardship practices of agricultural industries	Monitor and evaluate practice change through the Paddock to Reef program.	NRM region, whole Reef catchment	TBA	Funding needs to be institutionalised

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
	Ongoing evaluation of extension and education approaches and adaptive management	NRM region, whole Reef catchment; whole GBRMP	TBA	
ACS5.1 Extent and type of stewardship practices of urban councils and industries	Extend the Paddock to Reef program to include monitoring of marine debris in the Reef and waterways	NRM region, whole Reef catchment; whole GBRMP	TBA	New Initiative Not yet funded
	Monitor compliance rates and best management practice adoption rates		TBA	Regional reports – funding uncertain
ACS6.1 Extent and type of stewardship practices of Reef-associated industries (e.g. ports and shipping)	Monitor compliance rates and best management practice adoption rates	NRM region, whole Reef catchment; whole GBRMP	TBA	
	Extend the Paddock to Reef program to include monitoring of marine debris in the Reef and waterways	NRM region, whole Reef catchment; whole GBRMP	TBA	New Initiative Not yet funded
	Monitor compliance rates and best management practice adoption rates		TBA	New Initiative Not yet funded
ACS6.2 Arrangements to ensure shipping in the Reef is safe.	AMSA and Reef Vessel Tracking System annual reporting	NRM region, whole Reef catchment; whole GBRMP	Annual	
ACS6.3 Number of shipping accidents	AMSA; Reef VTS; MSQ	Whole GBRMP	AMSA	AMSA
ACS6.4 Extent to which ports and shipping apply 'best practice' principles	AMSA; Reef VTS; MSQ; annual reports	Whole GBRMP	AMSA	AMSA

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
ACS6.5 Extent and type of stewardship practices of Reef-based tourism	SELTMP telephone surveys	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Extend the Paddock to Reef program to include monitoring of marine debris in the GBRMP and waterways	NRM region, whole Reef catchment; whole GBRMP	TBA	New Initiative Not yet funded
ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing	SELTMP telephone surveys	NRM region, whole GBRMP	Every 2 years, and after major event	Ad hoc funding at present
	Monitor compliance rates and best management practice adoption rates		TBA	New Initiative Not yet funded
CV4.1 Reef contribution to overall Quality of Life	SELTMP face-to-face	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	CQU Recreation Index	NRM region, Reef catchment; GBRMP	Every 2 years	New Initiative, Not yet funded
	InfoFish	NRM region, Reef catchment; GBRMP		Site-specific data requires extra resources
	QDAF Recreational fishing surveys	NRM region, whole Reef catchment; whole GBRMP	Annual	Site-specific data requires extra resources
CV4.1.1 Number of Traditional Owner benefit sharing initiatives	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New Initiative Not yet funded

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
CV4.2 Levels of optimism about the future of the Reef	SELTMP face-to-face	NRM region, whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
CV4.3 Levels of satisfaction with Reef experiences	SELTMP face-to-face	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
CV4.4 Influences on Reef experiences (negative and positive)	SELTMP face-to-face	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Media tracking and analysis	NRM region, Reef catchment; GBRMP	Annual	Not yet funded
	Big Data analytics	NRM region, Reef catchment; GBRMP	Near real-time	New Initiative Not yet funded
CH1.2 Perceptions of the Reef's aesthetic beauty	SELTMP face-to-face	NRM region, whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Big Data analytics	NRM region, whole GBRMP	Near real-time	New Initiative, Not yet funded
CH1.3 Perceived impacts on the Reef's aesthetic beauty	Big Data analytics	NRM region, whole GBRMP	Near real-time	Link to AIMS LTSP; the Authority's EotR; Not yet funded; New Initiative

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
CH2.1 Identification, state and trend of Indigenous heritage values	May be modelled on work developed by Prof Sean Ulm (JCU) <sup>16</sup>	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
CH2.2 Number and strength of (a) Traditional Owner connections with Reef resources including identification, protection and management of Indigenous cultural heritage in sea country	May be modelled on work developed by Prof Sean Ulm (JCU) <sup>17</sup>	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
CH2.2 Number and strength of (b) Traditional Owner benefits from the Reef	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
CH2.2 Number and strength of (c) partnerships, institutional arrangements and	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded

<sup>16</sup> Rowland, M., Ulm, S. & Roe, M. (2014) Approaches to Monitoring and Managing Indigenous Australian Coastal Cultural Heritage Places. Queensland Archaeological Research 17: 37-48

<sup>17</sup> Rowland, M., Ulm, S. & Roe, M. (2014) Approaches to Monitoring and Managing Indigenous Australian Coastal Cultural Heritage Places. Queensland Archaeological Research 17: 37-48

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
agreements between Traditional Owners and all Reef stakeholders				
CH2.2 Number and strength of (d) Traditional Owner-driven frameworks and participatory monitoring methods	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, whole Reef catchment; whole GBRMP	Every 2 years	New initiative Not yet funded
CH2.3 Levels of Traditional Owner satisfaction with (a) Identification, documentation and storage of cultural information; (b) Traditional Owner-led methodologies; (c) participation in Reef management; (d) extent to which Traditional Ecological Knowledge is identified, maintained and transferred	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
CH3.1 Place attachment associated with the Reef	SELTMP face-to-face	NRM region, whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions;	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
CH3.2 Identity associated with the Reef	SELTMP face-to-face	NRM region, whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions;	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
CH3.3 Pride in the Reef	SELTMP face-to-face	NRM region, whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions;	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	Media tracking and analysis	NRM region, whole GBRMP	Annual	Not yet funded
	Big data analytics	NRM region, whole GBRMP	Near real-time	New Initiative Not yet funded
CH3.4 Personal connection to the Reef	SELTMP face-to-face	NRM region, whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions;	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
CH4.1 Identification, protection and management of historic maritime heritage in the Reef's environments	May be modelled on work developed by the Authority <sup>18</sup>	Whole GBRMP		New initiative Not yet funded
EV3.1 Vulnerability of Reef-dependent industries	SELTMP telephone surveys	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Ecological economic LTMP	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	ABS — Environmental Accounts for the Great Barrier Reef	NRM region, Reef catchment; GBRMP	Annual	Link to AIMS LTMP; other programs which monitor Reef health; Ad-hoc
EV3.2 Adaptive capacity of Reef-dependent industries				
EV3.3 Economic viability of Reef: tourism				
EV3.4 Economic contribution of Reef-dependent industries	ABS — Environmental Accounts for the Great Barrier Reef	NRM region, Reef catchment; GBRMP	Annual	Ad-hoc at present – needs to be institutionalised

<sup>18</sup> The Authority considers that carrying out 'cultural heritage monitoring' is characterised by: a. Monitoring and recording the condition of the site over time through photography and other observations. b. The identification of areas that may be prone to damage through natural causes and the monitoring of those features. c. Submission of data to the Authority to assist with site management. The Authority (2017) Historic Heritage Assessment – Maritime Cultural Heritage Protection Special Management Area. Retrieved from: <http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/3235/1/Historic-heritage-assessment-Maritime-Cultural-Heritage-Guideline.pdf>



Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
	Ecological Economic Long-Term Monitoring Program	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative, Not yet funded
EV5.2 Reef-related employment	Ecological Economic Long-Term Monitoring Program	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	ABS — Environmental Accounts for the Great Barrier Reef	NRM region, Reef catchment; GBRMP	Annual	Ad-hoc at present
EV5.2.1 Number of employment opportunities for Traditional Owners in Great Barrier Reef sea-country management	Ecological Economic Long-Term Monitoring Program	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	ABS — Environmental Accounts for the Great Barrier Reef	NRM region, Reef catchment; GBRMP	Annual	Ad-hoc at present
EV5.2.2 Number of employment opportunities for Traditional Owners in Reef-based industries	Ecological Economic Long-Term Monitoring Program	NRM region, whole Reef catchment; whole GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	ABS — Environmental Accounts for the Great Barrier Reef	NRM region, whole Reef catchment; whole GBRMP	Annual	Ad-hoc at present
G1.1 Number and type of opportunities for improved Reef 2050 Plan Governance	SELTMP face-to-face	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
	JCU-led governance assessment and monitoring	Whole Reef catchment; whole GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
G1.2 Number and severity of system-wide problems for delivery of key Reef 2050 Plan targets	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	ABS — Environmental Accounts for the Great Barrier Reef	NRM region, Reef catchment; GBRMP	Annual	Ad-hoc at present
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G2.1 Number and type governance subdomains that counteract Reef 2050 Plan targets/action	Traditional Owner-led monitoring — may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G2.2 Status of partnerships, inter-government arrangements	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years	New initiative Not yet funded
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G3.2 Support for management	SELTMP face-to-face	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Outlook assessment of management effectiveness	Reef catchment; GBRMP	Every four years	Regular funding, every four years

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions;	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G3.3 Community confidence in management	SELTMP face-to-face	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions;	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G3.4 Sectoral/community contributions to decision-making	SELTMP face-to-face; telephone surveys	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present
	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years	New initiative Not yet funded
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G4.1 Availability of integrated knowledge sets to decision-makers	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative, Not yet funded
	SELTMP face-to-face; telephone surveys	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present New questions may be added
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present

Priority Indicator	Survey/data collection method	Spatial scale	Frequency	Other information
G4.2 Extent to which integrated knowledge sets are used in decision-making	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative, Not yet funded
	SELTMP face-to-face; telephone surveys	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	Ad-hoc funding at present New questions to be added
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present
G4.3 Management of integrated knowledge sets	Traditional Owner-led monitoring – may include face-to-face interviews; group discussions	NRM region, Reef catchment; GBRMP	Every 2 years, and after major event	New initiative Not yet funded
	JCU-led governance assessment and monitoring	Reef catchment; GBRMP	Every 2 years	Ad-hoc funding at present

## 11.0 Assessment of activities required to implement the recommended design

Table 11 lists the activities needed to design a satisfactory assessment and monitoring of the Great Barrier Reef's human dimensions. Because there is currently so little monitoring activity focusing on the Reef's human dimensions, we invited researchers who have previously undertaken work within the Reef to submit an expression of interest to address monitoring gaps identified in this report, using a pro-forma that the NESP team developed (See Figure 7 below Table 11). We emphasised that the expression of interest was to be used as a guide for developing an adequate assessment and monitoring program for the Reef's human dimensions, and we are not recommending how these activities should be best resourced. Table 11 below was derived from the proposals submitted by Reef researchers using the pro-forma. Some activities listed in the table are not on-going monitoring programs, but they need to be completed **before** monitoring can commence. Specific considerations of assessment and monitoring from the perspective of Traditional Owners is undertaken by the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP)'s Indigenous Heritage Expert Group, and thus were not considered by the Human Dimensions Expert Group. However, we have listed some key heritage project proposals here, as they were submitted as part of the human dimensions expression of interest process, and there is overlap with these and some other elements of the human dimensions program.

**Table 11. Summary of activities required for Great Barrier Reef human dimensions monitoring program (Same as Executive Table 1).**

Activity to address monitoring gaps
Governance benchmarking
Human Dimensions benchmarking
Great Barrier Reef System of Experimental Environmental Accounts — non-market valuations and economic contribution of Reef-dependent industries
Insights into stewardship and behaviour change of Reef-dependent communities and industries
Recreational index — Non-market valuations
Reef Use and Visitation Patterns — tourism trends
Reef SELTMP — covers attitudes, economic dependency, social and cultural values, satisfaction with management and governance arrangements, human use patterns
Locate and assess condition of the historic shipwreck, Heroine (1846), in the Whitsunday Plan of Management
Historic maritime heritage — assessment and monitoring of key ship wrecks (Yongala, Foam, Mermaid, Pandora, Gothenburg, Llewellyn) and island light houses
Aesthetic value monitoring
Big Data — Tourism Economic Impact Model

Comprehensive synthesis of cultural heritage places on the Great Barrier Reef. <sup>19</sup>
Dynamic predictive modelling of the vulnerability of Indigenous, non-Indigenous and shared Great Barrier Reef heritage <sup>20</sup>
Trialling and using geo-indicators to monitor the vulnerability of Indigenous and non-Indigenous Great Barrier Reef heritage <sup>21</sup>
Use of longitudinal data for predictive modelling of social and economic factors that have the most 'influence' on the Reef and those which are most influenced by Reef health. <i>Survey of people from within and outside the Great Barrier Reef catchment area</i>
Predictive modelling of economic factors that have the most 'influence' on the Reef and those which are most influenced by Reef health. Surveys of (a) Great Barrier Reef catchment residents; (b) Businesses and other organisations operating in the Reef; and (c) Reef visitors
Media tracking and analysis
Site-specific recreational fishing surveys through expansion of QDAF boat ramp survey (BRS) in regional areas accessing the Great Barrier Reef, to monitor fishing effort, number and species of fish kept and released, catch rates, visitation and residential suburb of the visitor
Reef Stewardship Assessment and Monitoring Program Design
Tracking Environmental Stewardship Indicators – farming sector

<b>Project:</b> (Insert name)		
<b>Project Lead:</b> (Insert name)		
Total estimated budget:		
<b>Objectives:</b> List the objectives of the work to be undertaken by the Project team		
<b>Deliverables:</b> List the expected outputs of the work		
<b>Method:</b> Provide a brief description of the approach you intend to adopt to achieve the objectives and produce the deliverable		
<b>Project Team</b>		
<b>Name</b>	<b>Institution</b>	<b>FTE</b>

<sup>19</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team

<sup>20</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team

<sup>21</sup> This suite of projects to be undertaken on behalf of Traditional Owners and developed with Traditional Owners through the Indigenous Heritage Working Group and the Indigenous Reef 2050 Plan Team

Project contribution over 5 years												
Year	2019		2020		2021		2022		2023		Total	
Org	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind
RIMReP												
Research org,												
Gov. agency												
Industry (name)												
Other (name)												
<b>Project Resources</b> Describe the resources required to achieve the objectives and produce the deliverables including access to data												
Item	Cash				In-kind				Total			
Salary												
Travel												
Operating												
Total project resources												
<b>Budget Comments:</b> Provide any relevant explanation of budget calculations or assumptions												
<b>Other considerations</b>												

**Figure 7. RIMREP Human Dimensions Assessment and Monitoring Program Template.**

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## 13.0 Appendix 1

The Human Dimensions Expert Group have adopted the same set of human dimension values used by the Great Barrier Marine Park Authority for assessment, monitoring and management of activities within the Great Barrier Reef Marine Park (the Authority 2017a; 2017b; 2017c). These are:

- Access to Reef resources;
- Reef aesthetics;
- Appreciation, understanding and enjoyment of the Reef;
- Human health associated with the Reef;
- Personal connection to the Reef;
- Intra and inter-generational equity associated with the Reef;
- Empowerment derived from the Reef; and
- Employment and income derived from Reef-dependent industries
- Heritage (the Authority, 2017a).

**Access** refers to people's ability to enter and use the Great Barrier Reef Marine Park (the Authority) and its resources. Millions of people visit the GBRMP each year. It provides a wide range of recreational opportunities such as boating, snorkeling, diving, fishing and nature appreciation. There are also opportunities for commercial fishing, marine tourism and education. In some key locations, management arrangements such as Plans of Management separate or limit certain use to avoid conflicts. Access also refers to the potential for people to visit and use the GBRMP in the future.

**Aesthetic** values are associated with healthy intact ecosystems. They are connected to both environmental attributes (such as bays, beaches, continental islands, coral cays, mangroves, marine animals, water, as well as seagrass meadows) and experiential attributes (presented by beauty, discovery, naturalness, remoteness, sense of inspiration, as well as tranquility and solitude). The aesthetic values of the Reef are experienced and described from a variety of perspectives:

- Panoramic — above in the air or high lookout points. This perspective displays patterns of waters, reefs, cays and islands, and as a vast landscape.
- At water or land level — the Reef at eye level, as sky, water, and land emerging from water and with a sense of world beneath the water.
- Below the water — the Reef is an underwater landscape. The three-dimensional qualities of the underwater landscape.

Aesthetics refers to people's perceptions of the beauty of a site or object. While aesthetics are strongly influenced by visual appearance, all the senses play a role—sight, sound, smell, touch and taste. Aesthetics influence the way in which people value and enjoy the Reef. Aesthetics is highly personal—one person may seek solitude and quiet, while another seeks social interactions. The same person often values different elements at different times. Places that are easy to access are less likely to provide opportunities for enjoying solitude or

tranquility, but may enhance opportunities for socialising and personal comfort. Perceptions of the beauty and desirability of natural areas are influenced by people's personal experiences and cultural backgrounds. Psychological, social or cultural dimensions of aesthetics include a sense of history, a sense of place, inspiration, spiritual connections; and opportunities for learning, relaxation, recreation and escapism. Indigenous perspective on aesthetic values may include cultural expressions such as storytelling, mythology, spirituality, literature, music/art, symbols of power, wealth. Aesthetics are recognised under criterion (vii) of the World Heritage Convention: for attributes which 'contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.' Aesthetics are closely linked to the condition of natural, cultural and historic heritage values within the GBRMP. The natural beauty of most of the GBRMP remains intact, especially for offshore coral reefs and aerial vistas, as well as for neighbouring islands (many of which are Queensland national parks). Significant loss of coral cover has reduced underwater aesthetic value at many inshore Reefs, particularly since the Year 2000 due to severe weather, crown-of-thorns sea star and increased sea surface temperature increases. Aesthetics is linked to wellbeing and also closely linked to social values such as access, understanding, appreciation and personal connection.

***Understanding, appreciation and enjoyment:*** Understanding refers to people's knowledge of the GBRMP, its values and the interconnected systems that support life on the Great Barrier Reef. Understanding comes from learning, either in-person or remotely. The levels of understanding held by coastal residents and Reef visitors is an important factor in how they may respond to potential impacts on Reef health. Personal experiences, together with scientific knowledge and cultural knowledge gained from stories passed from one generation to the next (including intergenerational aspects of learning for wise decision-making), provide a context for understanding the GBRMP and its values. Understanding allows reflection on what the Reef may have been like in the past; how it contributed to human wellbeing; and how it has responded to human activities.

Appreciation refers to realising and feeling grateful for the uniqueness of the Great Barrier Reef. Appreciation often grows with understanding. Enjoyment refers to the positive emotions people experience when they visit or see the GBRMP. Most people in the world will never visit the GBRMP in person, but many still enjoy the GBRMP through photographs, videos or stories. The GBRMP's biophysical and heritage values are the primary reasons why people visit the Reef either as part of a commercial tourist program or in a recreational capacity. There are many opportunities for coastal residents and visitors to learn about and help protect the Great Barrier Reef. A key component of many tourism programs is presenting and interpreting the GBRMP to their guests. Close to 70 per cent of visitors to the GBRMP travel with certified high standard tourism operators. These operators are committed to a high standard of presentation and interpretation as part of their daily operation. Through the Authority's [Reef Guardian](#) stewardship program, local stakeholders are encouraged to take hands-on actions to care for the Great Barrier Reef. RIMReP includes schools, local councils, farmers, graziers and commercial fishers. Participants are encouraged to go beyond what is required by law in their day-to-day activities and to become active stewards. This includes sharing information about their actions. Other stewardship initiatives such as the [Eye on the Reef](#) program contribute vital information about GBRMP values from people who are in the



GBRMP daily, such as tourism operators, researchers, students, as well as Queensland Parks and Wildlife Service officers. Participants contribute substantially to understanding trends in the condition of values through time and at many locations throughout the Marine Park.

**Human health** refers to the physical and mental health benefits that residents and visitors derive from the Marine Park. People benefit from relaxation and stress reduction through recreational activities and access to natural settings; healthy inputs to diets from freshly caught local seafood; and exercise from snorkeling, boating and fishing. Conversely, people may be negatively affected if Reef health declines — depression and anxiety have been associated with environmental decline. The health benefits people derive from the Marine Park are diminished by those impacts that make the Marine Park a less attractive and fulfilling place to visit, and by those that reduce the quality and availability of its food resources, clean air, water or sediment.

**Personal connection** refers to people's aspirations, spiritual connections, cultural ties, employment, stewardship activities, places of residence and recreational activities that are associated with the Marine Park. It links each individual stakeholder, visitor, local resident and Traditional Owner to the Marine Park. The Reef is a key part of the identity of adjacent coastal communities. It is a major source of pride and distinction for these communities. More than 95 per cent of nearby residents have visited the Reef at least once in their lives. Many coastal residents report that they chose where they live so as to be close to the Reef and that there are 'not many other places better than the Reef for the recreation activities they enjoy'. Commercial fishers and tourism operators identify very strongly with their occupations and the places where they live and work. This is highlighted by the fact that few, if any, who were directly affected by Severe Tropical Cyclone Yasi or the central Queensland floods in 2011 changed their jobs or moved elsewhere, despite economic imperatives to find alternative income.

Traditional Owners continue to maintain connection to their sea country, for example, through stories and songlines, sites of cultural significance and important saltwater ceremonies. Australians in general also identify strongly with the Reef as a national icon. A 2014 survey conducted as part of the Social and Economic Long-Term Monitoring Program found that 80 per cent of Australians see the Reef as vital to their identity. Across the world, people of many nations feel a strong personal connection to the Great Barrier Reef, even if they have never visited in person.

**Equity** relates to fairness in the distribution of benefits and impacts across the community and depends on sustainable use that meets the needs of the current generations without compromising the ability of future generations to meet their own needs<sup>22</sup>. Impacts to equity

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<sup>22</sup> Brundtland, G. H., & World Commission on Environment and Development. (1987). *Our common future: Report of the World Commission on Environment and Development*. Retrieved from <http://www.un-documents.net/wced-ocf.htm>

may result in changes to the current and future generations' access, enjoyment, appreciation and use of the Great Barrier Reef. Equity may also be compromised if there are impacts to human health through the decline of ecosystem health and/or contamination of air, water or sediments.

**Empowerment** is the process that enables citizens, groups, communities, stakeholders, and organisations to undertake actions and participate meaningfully in the protection and management of the Great Barrier Reef. Factors that enhance human wellbeing of Reef-dependent people may contribute to empowerment.

**Employment and income:** Employment refers to jobs created or maintained as a result of sustainable activities conducted in the Marine Park. Income refers to money that people receive as a result of activities conducted in the Marine Park. The benefits that businesses, individuals and communities derive from the Marine Park are founded on its biodiversity, species distribution and abundance, geomorphological features, and the range of social, Indigenous and historic heritage values. Employment and income are therefore affected by impacts that diminish the condition of these foundational values.

Activities in the Marine Park generate income and employment for tens of thousands of people both within and outside the Marine Park, as the flow-on benefits reach far beyond the boundaries of the Marine Park. The Marine Park supports significant commercial uses linked to recreation, tourism and commercial fishing. These industries play an important role in regional Queensland and rely on a healthy Reef ecosystem for long-term economic stability. The economic contribution generated by tourism, recreation, commercial fishing and scientific research in the Great Barrier Reef catchment and the World Heritage Area in 2012 was estimated to be \$5.6 billion. This has been relatively stable over the past five years. Commercial marine tourism is a major use of the Marine Park, both in terms of economic value and employment. It is estimated that, in 2011–12, Great Barrier Reef-based tourism contributed approximately \$5.2 billion to the Australian economy and supported employment equivalent to about 69,000 full-time positions. It is important to note, the economic estimates are likely to be only a portion of the total economic value of the Great Barrier Reef, as most ecosystem services that are not traded in markets have not yet been calculated. For example, the non-market economic value of a healthy coral Reef system in providing a physical barrier from wave and tsunamis impacting coastal areas, or mangrove habitats that also provide a buffer between land and sea and filter sediment and nutrients.

**Heritage** A place's natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians. Historic heritage includes places associated with the non-Indigenous cultural heritage of Australia encompassed in the country's history. It can include historic shipwrecks, World War II features and sites, light stations, places of scientific significance, e.g. research stations, expedition sites; places of social significance, e.g. iconic sites such as Ninney Rise (Mission Beach), buildings, monuments, gardens, industrial sites, landscapes, cultural landscapes, archaeological sites, groups of buildings and precincts, or places which embody a specific cultural or historic value. Historic places tell us about national and social developments in Australia over the past few centuries, technical and creative achievements, and provide a

tangible link to past events, processes and people. World Heritage – sites of natural beauty and outstanding natural phenomena.

Indigenous heritage includes all places that are part of Aboriginal and Torres Strait Islander peoples' spiritual links to the land or which tell the story of Indigenous peoples from time immemorial to the present. It can include cultural practices, observances, customs and lore, sacred sites, sites of particular significance, places important for cultural tradition; stories, songlines, totems and languages; Indigenous structures, technology, tools and archaeology; ceremonial sites like bora rings and rock art, fish traps, burials, middens, scarred trees, camp sites and semi/permanent settlements.

## 14.0 Appendix 2 – Appendix 8

NESP 3.2.2 Reef-wide report and regional reports and attached separately

Appendix name	Location (URL)
Appendix 2: NESP Trialing the method	<a href="http://bit.ly/2mWylJ">http://bit.ly/2mWylJ</a>
Appendix 3: NESP Assessing human dimensions	<a href="http://bit.ly/2K8sxyx">http://bit.ly/2K8sxyx</a>
Appendix 4: NESP Assessing Cape York	<a href="http://bit.ly/2Kck2SY">http://bit.ly/2Kck2SY</a>
Appendix 5: NESP Assessing Burdekin	<a href="http://bit.ly/2KcbtaN">http://bit.ly/2KcbtaN</a>
Appendix 6: NESP Assessing Mackay WS	<a href="http://bit.ly/2Kcll33">http://bit.ly/2Kcll33</a>
Appendix 7: NESP Assessing Fitzroy	<a href="http://bit.ly/2OxyGrc">http://bit.ly/2OxyGrc</a>
Appendix 8: NESP Assessing Burnett Mary	<a href="http://bit.ly/2Oz409k">http://bit.ly/2Oz409k</a>

## 15.0 Appendix 9

**Table 12. Adequacy of the spatial and temporal (periodicity) scales of available secondary data sets.**

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Monthly	Reef aggregated	H	Great Barrier Reef Marine Park Authority	Tourist visits to the entire marine park (aggregated for whole Reef)	<a href="http://www.Reefmpa.gov.au/visit-the-Reef/visitor-contributions/Reef_visitation/numbers/tourist-visits-to-the-entire-marine-park">http://www.Reefmpa.gov.au/visit-the-Reef/visitor-contributions/Reef_visitation/numbers/tourist-visits-to-the-entire-marine-park</a>	Numerical	Excel
Monthly	Qld	H	QLD Gov.-NPSR	NPSR issued Penalty Infringement Notices (Nature Conservation PAM Regulation) - 2015	<a href="https://data.qld.gov.au/dataset/npsr-issued-penalty-infringement-notices-nature-conservation-pam-regulation-2015">https://data.qld.gov.au/dataset/npsr-issued-penalty-infringement-notices-nature-conservation-pam-regulation-2015</a>	Numerical/ Rich Text	Excel
Monthly	Qld	H	QLD Gov.-NPSR	NPSR issued Penalty Infringement Notices(Marine Parks Act)—2015	<a href="https://data.qld.gov.au/dataset/npsr-issued-penalty-infringement-notices-marine-parks-act-2015/resource/465efade-9bb0-410f-9f8c-4212b90080ad">https://data.qld.gov.au/dataset/npsr-issued-penalty-infringement-notices-marine-parks-act-2015/resource/465efade-9bb0-410f-9f8c-4212b90080ad</a>	Numerical/ Rich Text	Excel
Quarterly	Reef	H	Aust. Gov.-the Marine Park Authority	Vessel Registration Levels for the Reef Catchment Area	<a href="http://www.Reefmpa.gov.au/VesselRegistrations/">http://www.Reefmpa.gov.au/VesselRegistrations/</a>	Numerical	Interactive Web Page
Quarterly	Reef	H	Aust. Gov.-the Authority	Vessel Registration Levels for the Great Barrier Reef	<a href="http://www.Reefmpa.gov.au/VesselRegistrations/data.aspx">http://www.Reefmpa.gov.au/VesselRegistrations/data.aspx</a>	Numerical	Interactive Web Page
Quarterly	National	H	Aust. Gov.-ABS	Labour Force, Australia, Detailed, Quarterly, May 2017	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.5">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.5</a>	Numerical	Excel/online report

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
					<a href="#">5.003May%202017?OpenDocument</a>		
Annual	LGA	H	UC	Regional Wellbeing by LGA	<a href="http://www.canberra.edu.au/research/faculty-research-centres/ceraph/regional-wellbeing/survey-results/2016-survey-results/2016-results-by-rda-and-lga">http://www.canberra.edu.au/research/faculty-research-centres/ceraph/regional-wellbeing/survey-results/2016-survey-results/2016-results-by-rda-and-lga</a>	Numerical	Excel
Annual	NRM	H	UC	Regional Wellbeing by NRM	<a href="http://www.canberra.edu.au/research/faculty-research-centres/ceraph/regional-wellbeing/survey-results/2016-survey-results/2016-results-by-nrm-and-lls">http://www.canberra.edu.au/research/faculty-research-centres/ceraph/regional-wellbeing/survey-results/2016-survey-results/2016-results-by-nrm-and-lls</a>	Numerical	Excel
Annual	Reef	H	Aust. Gov.-The Great Barrier Reef Marine Park Authority	Reef-Guardian-Councils-Highlight-Report-2015-2016	<a href="http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3161/1/Reef-Guardian-Councils-Highlight-Report-2015-2016.pdf">http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3161/1/Reef-Guardian-Councils-Highlight-Report-2015-2016.pdf</a>	Rich Text	PDF
Annual	Reef	H	Aust. Gov.-The Great Barrier Reef Marine Park Authority	2015-16 Land & Sea-Country Partnerships Annual Report summary	<a href="http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3032/2/2015-16-Land-and-Sea-Country-Partnerships-Annual-Report-summary.pdf">http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3032/2/2015-16-Land-and-Sea-Country-Partnerships-Annual-Report-summary.pdf</a>	Numerical/ Rich Text	PDF Report
Annual	NRM	H	UC	Regional Wellbeing by NRM	<a href="http://www.canberra.edu.au/research/faculty-research-centres/ceraph/regional-">http://www.canberra.edu.au/research/faculty-research-centres/ceraph/regional-</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
					<a href="http://www.abs.gov.au/websitedbs/australianstat/75030201516?OpenDocument">wellbeing/survey-results/2016-survey-results/2016-results-by-nrm-and-lls</a>		
Annual	Reef NRM	H-M	Aust. Gov.-ABS	Value of Agricultural Commodities Produced, Australia, 2015-16	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7503.02015-16?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7503.02015-16?OpenDocument</a>	Numerical	Excel
Ad hoc	Reef/ NRM	H	Aust. Gov.-ABS	Experimental Environmental-Economic Accounts for the Great Barrier Reef	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4680.0Main+Features12017">http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4680.0Main+Features12017</a>	Numerical/ Rich Text	Excel
Annual	NRM	M	Aust. Gov.-ABS	Tourist Accommodation, Small Area Data, Queensland	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8635.3.55.001Main+Features1Jun%202013?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8635.3.55.001Main+Features1Jun%202013?OpenDocument</a>	Numerical	Excel
Annual financial year	- NRM	H-M	Aust. Gov.-ABS	Australian Industry	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02015-16?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02015-16?OpenDocument</a>	Numerical	Excel
Annual	Reef	H	Aust. Gov.-The Great Barrier Reef Marine Park Authority	Reef-Guardian-Councils-Highlight-Report-2015-2016	<a href="http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3161/1/Reef-Guardian-Councils-Highlight-Report-2015-2016.pdf">http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3161/1/Reef-Guardian-Councils-Highlight-Report-2015-2016.pdf</a>	Rich Text	PDF
Annual	Reef	H	Aust. Gov.-The Great Barrier Reef Marine Park Authority	2015-16 Land and Sea Country Partnerships Annual Report summary	<a href="http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3032/2/2015-16-Land-and-Sea-Country-Partnerships-Annual-Report-summary.pdf">http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3032/2/2015-16-Land-and-Sea-Country-Partnerships-Annual-Report-summary.pdf</a>	Numerical/ Rich Text	PDF Report

Periodicity	Scale	Adequacy of scale & periodicity (H,M,L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	Qld		Qld Gov.-TMR	Trade Statistics for Queensland Ports—30 June 2015	<a href="https://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports">https://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports</a>	Numerical/ Rich Text	PDF Statistical Report
Annual	Qld	H	QGSO	Queensland regional profiles	<a href="http://statistics.qgso.qld.gov.au/">http://statistics.qgso.qld.gov.au/</a>	Numerical	Excel
Annual	Qld	H	Qld Gov.	Population estimates by Indigenous status, LGAs	<a href="https://data.qld.gov.au/dataset/pop-est-indigenous-status/resource/6e4b863c-ceb4-4191-929e-adb74f5b64e3">https://data.qld.gov.au/dataset/pop-est-indigenous-status/resource/6e4b863c-ceb4-4191-929e-adb74f5b64e3</a>	Numerical	Excel
Not yet specified	Reef NRM	H	CSIRO-SELTMP	Reef Tourists	<a href="http://seltmp.eatlas.org.au/seltmp/survey-data">http://seltmp.eatlas.org.au/seltmp/survey-data</a>		
Not yet specified	Reef NRM	H	CSIRO-SELTMP	Australian Residents	<a href="http://seltmp.eatlas.org.au/seltmp/survey-data">http://seltmp.eatlas.org.au/seltmp/survey-data</a>		
Not yet specified	Reef NRM	H	CSIRO-SELTMP	Reef Tourism Operators	<a href="http://seltmp.eatlas.org.au/seltmp/survey-data">http://seltmp.eatlas.org.au/seltmp/survey-data</a>	Numerical	Excel
Not yet specified	Reef NRM	H	CSIRO-SELTMP	Reef Coastal Residents	<a href="http://seltmp.eatlas.org.au/seltmp/survey-data">http://seltmp.eatlas.org.au/seltmp/survey-data</a>	Numerical	Excel
Not yet specified	Reef NRM	H	CSIRO-SELTMP	Reef Commercial Fishers	<a href="http://seltmp.eatlas.org.au/seltmp/survey-data">http://seltmp.eatlas.org.au/seltmp/survey-data</a>	Numerical	Excel



Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	Reef NRM	H	Aust. Gov.-ABS	Value of Agricultural Commodities Produced, Australia, 2015-16	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7503.02015-16?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7503.02015-16?OpenDocument</a>	Numerical	Excel
Annual	NRM	H	Aust Gov - ABS	Data by Region	<a href="http://stat.abs.gov.au/itt/r.jsp?databyregion">http://stat.abs.gov.au/itt/r.jsp?databyregion</a>	Numerical	Excel
Annual financial year	- NRM	H-M	Aust. Gov.-ABS	Australian Industry	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02015-16?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02015-16?OpenDocument</a>	Numerical	Excel
Not specified	Qld	H-M	Qld Gov.-QSpatial	Reef plan - cane management practice adoption - basin level	<a href="http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Reef%20plan%20-%20cane%20management%20practice%20adoption%20-%20basin%20level%22">http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Reef%20plan%20-%20cane%20management%20practice%20adoption%20-%20basin%20level%22</a>	Spatial	Shape File
Every years	5 National	M	Aust. Gov.-ABS	ABS Census Data	<a href="http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Census?opendocument&amp;ref=topBar">http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Census?opendocument&amp;ref=topBar</a>	Numerical	Excel
Quarterly	National	M	Aust. Gov.-ABS	Australian Demographic Statistics	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202016?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202016?OpenDocument</a>	Numerical	Excel
Quarterly	National	M	Aust. Gov.-TRA	International Visitors in Australia	<a href="https://www.tra.gov.au/ArticleDocuments/185/International_Visitors_in_Australia_September_2012.pdf.aspx?Embed=Y">https://www.tra.gov.au/ArticleDocuments/185/International_Visitors_in_Australia_September_2012.pdf.aspx?Embed=Y</a>	Numerical/ Rich Text	PDF Report

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	NRM	M	Aust. Gov.-ABS	Tourist Accommodation, Small Area Data, Queensland	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8635.3.55.001Main+Features1Jun%202013?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8635.3.55.001Main+Features1Jun%202013?OpenDocument</a>	Numerical	Excel
Annual	Qld	M	Aust Gov - ABARES	Catchment Scale Land Use of Australia	<a href="http://www.agriculture.gov.au/abar-es/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_luausg9abl20160616_11a.xml">http://www.agriculture.gov.au/abar-es/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_luausg9abl20160616_11a.xml</a>	Numerical	Excel
Annual	Qld	M	Aust. Gov.-ABARES	Region data - Selected physical and financial characteristics by state - Australian sugarcane farm businesses: Financial performance, 2013-14	<a href="http://www.agriculture.gov.au/abar-es/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_asffpd9absf20151218.xml">http://www.agriculture.gov.au/abar-es/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_asffpd9absf20151218.xml</a>	Numerical	Excel
Annual	Qld	M	Aust. Gov.-ABARES	Rate of return data - Selected physical and financial characteristics by state - Australian sugarcane farm businesses: Financial performance, 2013-14	<a href="http://www.agriculture.gov.au/abar-es/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_asffpd9absf20151218.xml">http://www.agriculture.gov.au/abar-es/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_asffpd9absf20151218.xml</a>	Numerical	Excel
Annual	Qld	M	Aust. Gov.-TRA	State Tourism Satellite Accounts 2016-16	<a href="https://www.tra.gov.au/ArticleDocuments/254/Appendix%20State%20Tourism%20Satellite%20Accounts%202015-16.xlsx.aspx">https://www.tra.gov.au/ArticleDocuments/254/Appendix State Tourism Satellite Accounts 2015-16.xlsx.aspx</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	Qld	M	Aust. Gov.-TRA	A Tourism businesses in Australian states and territories by employment	<a href="https://www.tra.gov.au/ArticleDocuments/185/Appendix A Tourism businesses in Australian states and territories by em....xlsx.aspx">https://www.tra.gov.au/ArticleDocuments/185/Appendix A Tourism businesses in Australian states and territories by em....xlsx.aspx</a>	Numerical	Excel
Annual	Qld	M	Aust. Gov.-TRA	Tourism businesses by employment size in Queensland tourism regions	<a href="https://www.tra.gov.au/ArticleDocuments/185/Appendix B Tourism businesses by employment size in tourism regions(1).xls.aspx">https://www.tra.gov.au/ArticleDocuments/185/Appendix B Tourism businesses by employment size in tourism regions(1).xls.aspx</a>	Numerical	Excel
Annual	Qld	M	Aust. Gov.-TRA	State and territory tourism forecast 2017	<a href="https://www.tra.gov.au/ArticleDocuments/257/State and Territory Forecast Tables 2017.xlsm.aspx">https://www.tra.gov.au/ArticleDocuments/257/State and Territory Forecast Tables 2017.xlsm.aspx</a>	Numerical	Excel
Annual	Qld	M	Aust. Gov.-TRA	Tourism Investment Monitor 2016	<a href="https://www.tra.gov.au/ArticleDocuments/185/Tourism Investment Monitor 2016 Excel Tables.xlsx.aspx">https://www.tra.gov.au/ArticleDocuments/185/Tourism Investment Monitor 2016 Excel Tables.xlsx.aspx</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.	Current volume and load, and change over time of discharge from sewage treatment plants into waterways	<a href="https://data.qld.gov.au/dataset/soe2015-volume-and-load-of-sewage-treatment-plants/resource/indicator-3-2-0-4-1">https://data.qld.gov.au/dataset/soe2015-volume-and-load-of-sewage-treatment-plants/resource/indicator-3-2-0-4-1</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-DAF	Fishery monitoring data	<a href="https://data.qld.gov.au/dataset/fishery-monitoring-data/resource/743681ed-53a0-41ef-9392-9cc5cd2cdcfb">https://data.qld.gov.au/dataset/fishery-monitoring-data/resource/743681ed-53a0-41ef-9392-9cc5cd2cdcfb</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	Qld	M	Qld Gov.-Qfish	The commercial catch and effort data for the Beam trawl fishery for all years from 1990.	<a href="http://qfish.fisheries.qld.gov.au/query/commercial-beam-trawl-catch-and-effort/table">http://qfish.fisheries.qld.gov.au/query/commercial-beam-trawl-catch-and-effort/table</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-Qfish	Commercial Harvest Fisheries	<a href="http://qfish.fisheries.qld.gov.au/query/commercial-harvest-fisheries/table">http://qfish.fisheries.qld.gov.au/query/commercial-harvest-fisheries/table</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-Qfish	The commercial catch and effort data for the Line fishery for all years from 1990.	<a href="http://qfish.fisheries.qld.gov.au/query/commercial-line-catch-and-effort/table">http://qfish.fisheries.qld.gov.au/query/commercial-line-catch-and-effort/table</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-Qfish	The commercial catch and effort data for the Net fishery for all years from 1990.	<a href="http://qfish.fisheries.qld.gov.au/query/commercial-net-catch-and-effort/table">http://qfish.fisheries.qld.gov.au/query/commercial-net-catch-and-effort/table</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-Qfish	The commercial catch and effort data for the Otter trawl fishery for all years from 1990.	<a href="http://qfish.fisheries.qld.gov.au/query/commercial-otter-trawl-catch-and-effort/table">http://qfish.fisheries.qld.gov.au/query/commercial-otter-trawl-catch-and-effort/table</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-Qfish	The commercial catch and effort data for the Pot fishery for all years from 1990.	<a href="http://qfish.fisheries.qld.gov.au/query/commercial-pot-catch-and-effort/table">http://qfish.fisheries.qld.gov.au/query/commercial-pot-catch-and-effort/table</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-QGSO	Domestic tourism: (a)(b) Day visitors by Queensland tourism region visited, 2005–06 to 2015–16	<a href="http://www.qgso.qld.gov.au/products/tables/domestic-tourism-day-visitors-qld/index.php">http://www.qgso.qld.gov.au/products/tables/domestic-tourism-day-visitors-qld/index.php</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-QGSO	Domestic tourism: (a)(b) Overnight visitor trips by	<a href="http://www.qgso.qld.gov.au/products/tables/domestic-visitors-qld-tourism-region/index.php">http://www.qgso.qld.gov.au/products/tables/domestic-visitors-qld-tourism-region/index.php</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
				Queensland tourism region, 2005–06 to 2015–16			
Annual	Qld	M	Qld Gov.- QGSO	International visitors (a)(b) by Queensland Tourism region, 2005–06 to 2015–16	<a href="http://www.qgso.qld.gov.au/products/tables/internat-visitors-qld-tourism-region/index.php">http://www.qgso.qld.gov.au/products/tables/internat-visitors-qld-tourism-region/index.php</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.- DAF	Queensland Commercial Fishery Catch and Effort Annual Totals from 2006 - Trawl (Beam)	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/6918e93a-c65e-40b0-bffa-74b22d05f930">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/6918e93a-c65e-40b0-bffa-74b22d05f930</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.- DAF	Queensland Commercial Fishery Catch and Effort Annual Totals from 2006 - Trawl (Otter)	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/1c45a387-0eaf-4f2a-a8b1-5b043585806f">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/1c45a387-0eaf-4f2a-a8b1-5b043585806f</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.- DAF	Queensland Commercial Fishery Catch and Effort Annual Totals from 2006 - Pot	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-pot/resource/025472a0-1a46-4392-837c-33e3f05ff014">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-pot/resource/025472a0-1a46-4392-837c-33e3f05ff014</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.- DAF	Queensland Commercial Fishery Catch and Effort Annual Totals from 2006 - Net	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-net">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-net</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	Qld	M	Qld Gov.-DAF	Queensland Aquaculture Production from 1995 to 2015	<a href="https://data.qld.gov.au/dataset/queensland-aquaculture-production-1995-2015/resource/0629abbc-ee4f-4e41-87c7-62f0591ae5bc">https://data.qld.gov.au/dataset/queensland-aquaculture-production-1995-2015/resource/0629abbc-ee4f-4e41-87c7-62f0591ae5bc</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-DAF	Queensland Commercial Fishery Observer data	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-observer-data/resource/2e6d2c6e-4ea1-4b00-aaaa-5c4480e1ea2a">https://data.qld.gov.au/dataset/queensland-commercial-fishery-observer-data/resource/2e6d2c6e-4ea1-4b00-aaaa-5c4480e1ea2a</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-DAF	Queensland Commercial Fishery Catch and Effort Annual Totals from 2006 - Line	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-line/resource/5290c7a1-506a-4c04-9c65-d74baa6cafb0">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-line/resource/5290c7a1-506a-4c04-9c65-d74baa6cafb0</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-DAF	Queensland Commercial Charter Fishery Catch and Effort from 2006 - Charter	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-charter/resource/1db4e748-5574-4b28-827a-49e7686849b8">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-charter/resource/1db4e748-5574-4b28-827a-49e7686849b8</a>	Numerical	Excel
Annual	Qld	M	Qld Gov.-MSQ	Registered Queensland regulated ships as at 31 July 2017	<a href="https://www.msq.qld.gov.au/About-us/Maritime-statistics-and-reports-library">https://www.msq.qld.gov.au/About-us/Maritime-statistics-and-reports-library</a>	Numerical	PDF
Annual	National	M	Aust. Gov.-TRA	Tourism Region Summaries	<a href="https://www.tra.gov.au/ArticleDocuments/185/Tourism_Region_Summaries_Final.xlsx.aspx">https://www.tra.gov.au/ArticleDocuments/185/Tourism_Region_Summaries_Final.xlsx.aspx</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	National	M	Aust. Gov.-TRA	State Tourism Satellite Accounts 2015-16	<a href="https://www.tra.gov.au/research/view-all-publications/all-publications/economic-reports/state-tourism-satellite-accounts-2015-16">https://www.tra.gov.au/research/view-all-publications/all-publications/economic-reports/state-tourism-satellite-accounts-2015-16</a>	Numerical/ Rich Text	Excel
Annual	National	M	Aust. Gov.-TRA	Travel by Australians: Results of the National Visitor Survey for year ending March 2017	<a href="https://www.tra.gov.au/research/view-all-publications/all-publications/national-visitor-survey-results/nvs-march-2017">https://www.tra.gov.au/research/view-all-publications/all-publications/national-visitor-survey-results/nvs-march-2017</a>	Numerical	Excel
Annual	National	M	Aust. Gov.-TRA	Results of the International Visitor Survey: Year Ending March 2017	<a href="https://www.tra.gov.au/research/view-all-publications/all-publications/international-visitor-survey-results/ivs-march-2017">https://www.tra.gov.au/research/view-all-publications/all-publications/international-visitor-survey-results/ivs-march-2017</a>	Numerical/ Rich Text	Excel
Annual	National	M	Aust. Gov.-TRA	State of the Industry	<a href="https://www.tra.gov.au/research/view-all-publications/all-publications/state-of-the-industry/state-of-the-industry-2016">https://www.tra.gov.au/research/view-all-publications/all-publications/state-of-the-industry/state-of-the-industry-2016</a>	Numerical/ Rich Text	Report
Annual	National	M	Aust. Gov.-TRA	December 2016 Quarterly Results of the International Visitor Survey	<a href="https://www.tra.gov.au/research/view-all-publications/all-publications/international-visitor-survey-results/international-visitors-in-australia-december-2016">https://www.tra.gov.au/research/view-all-publications/all-publications/international-visitor-survey-results/international-visitors-in-australia-december-2016</a>	Numerical/Rich Text	Excel
Annual	National	M	Aust. Gov.-TRA	State of the Industry 2016	<a href="https://www.tra.gov.au/tra/2016/soi/tra.gov.au/reports/soi2016/state_of_the_industry_2016.pdf">https://www.tra.gov.au/tra/2016/soi/tra.gov.au/reports/soi2016/state_of_the_industry_2016.pdf</a>	Numerical/ Rich Text	PDF Report

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	National	M	Aust. Gov.-TRA	Tourism Forecast 2017	<a href="https://www.tra.gov.au/ArticleDocuments/257/Tourism%20Forecast.s.pdf.aspx?Embed=Y">https://www.tra.gov.au/ArticleDocuments/257/Tourism%20Forecast.s.pdf.aspx?Embed=Y</a>	Numerical/ Rich Text	PDF Report
4 years	National	M	Aust. Gov.-ABS	National Aboriginal and Torres Strait Islander Social Survey	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/4714.0">http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/4714.0</a>	Numerical	Excel
Not specified	Reef NRM	M	Aust. Gov.-ABS	Land Account: Reef Region, Experimental Estimates	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4609.0.55.001Main+Features12014?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4609.0.55.001Main+Features12014?OpenDocument</a>	Numerical	Excel
Not specified	Reef NRM	M	Aust. Gov.-ABS	Land Management Practices in the Reef Catchments	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4619.0.55.0012008-09?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4619.0.55.0012008-09?OpenDocument</a>	Numerical	Excel
Not specified	Qld	M	Qld Gov.	Tourism Investment Opportunities	<a href="https://data.qld.gov.au/dataset/tourism-investment-opportunities-2013/resource/f3f8572b-3f75-4f3f-8d38-2cf4245116d9">https://data.qld.gov.au/dataset/tourism-investment-opportunities-2013/resource/f3f8572b-3f75-4f3f-8d38-2cf4245116d9</a>	Rich Text	Excel
Not specified	Qld	M	Qld Gov.	Marine pollution—2002 to 2016	<a href="https://data.qld.gov.au/dataset/marine-oil-spills-data/resource/280b7e6e-61b5-4502-b365-96bafea2950a">https://data.qld.gov.au/dataset/marine-oil-spills-data/resource/280b7e6e-61b5-4502-b365-96bafea2950a</a>	Numerical/ Rich Text	Excel
Not specified	Qld	M	Qld Gov.	Coal industry review statistical tables	<a href="https://data.qld.gov.au/dataset/coal-industry-review-statistical-tables">https://data.qld.gov.au/dataset/coal-industry-review-statistical-tables</a>	Numerical	Excel
Not specified	Qld	M	Qld Gov.	Number of heritage places and areas identified in local	<a href="https://data.qld.gov.au/dataset/soe2015-local-heritage-places-and-">https://data.qld.gov.au/dataset/soe2015-local-heritage-places-and-</a>	Numerical/ Rich Text	Excel



Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
				planning schemes and/or on local heritage registers	<a href="#">areas/resource/indicator-2-2-0-2-1</a>		
Not specified	Qld	M	Qld Gov.	Rate of change in extent of remnant native vegetation	<a href="https://data.qld.gov.au/dataset/soe2015-extent-and-rate-of-change-of-remnant-native-vegetation/resource/indicator-1-1-0-1-2">https://data.qld.gov.au/dataset/soe2015-extent-and-rate-of-change-of-remnant-native-vegetation/resource/indicator-1-1-0-1-2</a>	Numerical/ Rich Text	Excel
Not specified	Qld	M	Qld Gov.	Pressures affecting Queensland's aquatic ecosystems	<a href="https://data.qld.gov.au/dataset/soe2015-pressures-affecting-queenslands-aquatic-ecosystems/resource/indicator-3-2-0-3-1">https://data.qld.gov.au/dataset/soe2015-pressures-affecting-queenslands-aquatic-ecosystems/resource/indicator-3-2-0-3-1</a>	Numerical/ Rich Text	Excel
Not specified	Qld	M	Qld Gov.	Stationary energy sector greenhouse gas emissions	<a href="https://data.qld.gov.au/dataset/soe2015-stationary-energy-sector-greenhouse-gas-emissions/resource/indicator-3-4-0-2-1">https://data.qld.gov.au/dataset/soe2015-stationary-energy-sector-greenhouse-gas-emissions/resource/indicator-3-4-0-2-1</a>	Numerical	Excel
Not specified	Qld	M	Qld Gov.-DAF	Recreational Survey by Fishing Region-Comparison of 2000 and 2010 surveys-by retained	<a href="https://data.qld.gov.au/dataset/recreational-survey-by-fishing-region-comparison-of-2000-and-2010-surveys">https://data.qld.gov.au/dataset/recreational-survey-by-fishing-region-comparison-of-2000-and-2010-surveys</a>	Numerical	Excel
Not specified	Qld	M	Qld Gov.-DAF	Recreational Survey 2010 Caught, Released & Retained for All Species	<a href="https://data.qld.gov.au/dataset/recreational-survey-2010-catch-release-retained-all-species/resource/0c0ea940-d6d2-4a58-a3f5-935d4c0bba12">https://data.qld.gov.au/dataset/recreational-survey-2010-catch-release-retained-all-species/resource/0c0ea940-d6d2-4a58-a3f5-935d4c0bba12</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Not specified	Qld	M	Qld Gov.-DEHP	The Queensland heritage register	<a href="http://www.ehp.qld.gov.au/datasets/heritage-register.xml">http://www.ehp.qld.gov.au/datasets/heritage-register.xml</a>	Rich Text	Html
Not specified	Qld	M	Qld Gov.-DEHP	Register of World War II historic places	<a href="https://data.qld.gov.au/dataset/world-war-ii-historic-places-in-queensland/resource/cbd1aa53-38f3-414d-9ed2-29623047ac23">https://data.qld.gov.au/dataset/world-war-ii-historic-places-in-queensland/resource/cbd1aa53-38f3-414d-9ed2-29623047ac23</a>	Rich Text	Excel
Not specified	Qld	M	Qld Gov.-DEHP	Heritage register boundaries - Queensland	<a href="http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Heritage%20register%20boundaries%20-%20Queensland%22">http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Heritage%20register%20boundaries%20-%20Queensland%22</a>	Spatial	Shape File
Not specified	Qld	M	Qld Gov.-DEHP	Cultural Heritage Aboriginal and Torres Strait Islander parties list	<a href="https://data.qld.gov.au/dataset/cultural-heritage-aboriginal-and-torres-strait-islander-parties-list/resource/cd186b4f-b4bc-4c84-81fd-13b5d4698a0e">https://data.qld.gov.au/dataset/cultural-heritage-aboriginal-and-torres-strait-islander-parties-list/resource/cd186b4f-b4bc-4c84-81fd-13b5d4698a0e</a>	Rich Text	Excel
Not specified	Qld	M	Qld Gov.-QSpatial	Queensland commercial fishery 30 minute reporting grid	<a href="http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Queensland%20commercial%20fishery%2030%20minute%20reporting%20grid%22">http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Queensland%20commercial%20fishery%2030%20minute%20reporting%20grid%22</a>	Spatial	Shape File
Not specified	Qld	M	Qld Gov.-QSpatial	Cadastral data - Queensland - by area of interest	<a href="http://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={A07975CC-FE78-408F-959F-B0CDEC1C6EDA}">http://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={A07975CC-FE78-408F-959F-B0CDEC1C6EDA}</a>	Spatial	Shape File

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Not specified	Qld	M	UNSW	Rental Vulnerability Index	<a href="https://cityfutures.be.unsw.edu.au/cityviz/rental-vulnerability-index/">https://cityfutures.be.unsw.edu.au/cityviz/rental-vulnerability-index/</a>		Webpage
Annual	Qld		Qld Gov.-TMR	Trade Statistics for Queensland Ports—30 June 2015	<a href="https://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports">https://www.tmr.qld.gov.au/business-industry/Transport-sectors/Ports/Trade-statistics-for-Queensland-ports</a>	Numerical/ Rich Text	PDF Statistical Report
Not specified	Qld	M	Qld Gov.	Stationary energy sector greenhouse gas emissions	<a href="https://data.qld.gov.au/dataset/soe2015-stationary-energy-sector-greenhouse-gas-emissions/resource/indicator-3-4-0-2-1">https://data.qld.gov.au/dataset/soe2015-stationary-energy-sector-greenhouse-gas-emissions/resource/indicator-3-4-0-2-1</a>	Numerical	Excel
Quarterly	National	L	Aust. Gov.-ABARES	Agricultural commodities: June quarter 2017	<a href="http://www.agriculture.gov.au/abar-es/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php%3Ffid%3Dpb_agco md9abcc20170620_2had.t.xml">http://www.agriculture.gov.au/abar-es/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php%3Ffid%3Dpb_agco md9abcc20170620_2had.t.xml</a>	Numerical/ Rich Text	PDF Report & Excel
Annual	Qld	L	Qld Gov.-Qfish	Fishing region catch by survey (recreational)	<a href="http://qfish.fisheries.qld.gov.au/query/fishing-region-catch-by-survey/table">http://qfish.fisheries.qld.gov.au/query/fishing-region-catch-by-survey/table</a>	Numerical	Excel
Annual	Qld	L	Qld Gov.-Qfish	Fishing region released catch by survey (recreational)	<a href="http://qfish.fisheries.qld.gov.au/query/fishing-region-released-catch-by-survey/table">http://qfish.fisheries.qld.gov.au/query/fishing-region-released-catch-by-survey/table</a>	Numerical	Excel
Annual	NRM	L	Qld Gov.-Qfish	Recreational survey participation by region	<a href="http://qfish.fisheries.qld.gov.au/query/recreational-participation-by-region/table">http://qfish.fisheries.qld.gov.au/query/recreational-participation-by-region/table</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	Qld	L	Qld Gov.-Qfish	Charter fishery catch and effort data by method for all years from 1990.	<a href="http://qfish.fisheries.qld.gov.au/query/charter-catch-and-effort/table">http://qfish.fisheries.qld.gov.au/query/charter-catch-and-effort/table</a>	Numerical	Excel
Annual	National	L	Ports Australia	Navy visits	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=8&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=8&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Commercial vessel calls	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=60&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=60&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Australian Coastal Shipping: Number of vessel visits	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=103&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=103&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Number of Full Time Employees (FTE) Employed - Direct (Port Authority)	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=320&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=320&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Sugar Exports (mass tonnes)	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=13&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=13&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Coal Exports (mass tonnes)	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=9&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=9&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Gas Exports (mass tonnes)	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=24&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=24&amp;period=15</a>	Numerical	Excel
Annual	National	L	Ports Australia	Trade statistics	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/</a>	Numerical	Excel

Periodicity	Scale	Adequacy of scale & periodicity (H,M L)	Host organisation	Dataset name	Location (URL if available)	Data type	Data format
Annual	National	L	Ports Australia	Total Throughput (mass tonnes) for 2014/2015	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=1&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=1&amp;period=15</a>	Numeric	Excel
Annual	National	L	Ports Australia	Cruise vessel visits	<a href="http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=7&amp;period=15">http://portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=7&amp;period=15</a>	Numeric	Excel
Not specified	Qld	L	Qld Gov.- QPWS	QPWS Permits - April 2016 to June 2016	<a href="https://data.qld.gov.au/dataset/camping-and-vehicle-permits/resource/c1d1ff63-eb4-49e7-8dd5-41be0dbf6948">https://data.qld.gov.au/dataset/camping-and-vehicle-permits/resource/c1d1ff63-eb4-49e7-8dd5-41be0dbf6948</a>	Numeric/ Rich Text	Excel

**Table 13: Alignment of Reef 2050 Plan objectives and targets with the human dimensions indicator framework.**

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
<b>Community benefits</b> Access Aesthetics Understanding , appreciation and enjoyment Human health Personal connection Equity Empowerment Employment and income	CBO1 The rights of Traditional Owners to derive benefits from the conservation and cultural use of biological resources are recognised	CBT1 - increase in Traditional Owner benefit sharing initiatives	Not enough evidence to rate with confidence	CV4 Community health/ wellbeing/ satisfaction associated with the Reef	CV4.1 Reef contribution to overall Quality of Life.	Access Human Health Human health
	CBO2 A healthy Reef that supports sustainable lifestyles and livelihoods, and provides coastal communities with protection from extreme weather events. NB: 'supports sustainable lifestyles is consistent with economic targets	Suggest including targets to be more in line with CV.4 and CV.4.1	Not enough evidence to rate with confidence	CV4 Community health/ wellbeing/ satisfaction associated with the Reef	CV4.1 Reef contribution to overall Quality of Life CV4.1.1 Number of Traditional Owner benefit sharing initiatives CV4.2 Levels of optimism about the future of the Reef CV4.3 Levels of satisfaction with Reef experiences CV4.4 Influences on Reef experiences (negative and positive)	Access Employment and income Human health
	CBO3. Community benefits provided by the Reef including its superlative natural beauty and the sense of place, are maintained for current	CBT2 CB values identified and considered in decision-making NB: Need to develop specific target for CV1	3.5	CV1 Demographic stability across the catchment	CV1.1 Basic demographic characteristics CV1.2 Migration intentions over the next 12 months	Access

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
	and future generations. NB: suggest re-wording to avoid confusion with attributes of World Heritage i.e. aesthetics	NB: Need to develop specific target for CV2	3.5	CV 2 Security in the catchment including housing, safety and risk management.	CV2.1 Financial distress: (i) delay or cancel non-essential purchases; (ii) could not pay bills on time; (iii) went without meals, or unable to heat or cool home; (iv) asked for financial help from friends or family CV2.2 Crime rates CV2.3 Perceptions of safety CV2.4 Housing including availability and affordability	Human Health Employment and income Equity
<b>Community benefits</b> Access Aesthetics Understanding , appreciation and enjoyment Human health Personal connection Equity Empowerment Employment and income	CBO3. Community benefits provided by the Reef including its superlative natural beauty and the sense of place, are maintained for current and future generations. NB: suggest re-wording to avoid confusion with attributes of World Heritage i.e. aesthetics	NB: Need to develop specific target for CV3	3.5	CV3 Wellbeing/ happiness within the general community.	CV3.1 Community wellbeing (1-7): (i) place to live, (ii) coping with challenges, (iii) pride, (iv) optimism, (v) community spirit CV3.2 Decreasing community liveability: (i) liveability; (ii) friendliness; (iii) local economy; (iv) local landscape CV3.3 Personal Wellbeing (0-100). Satisfaction with: (i) standard of living; (ii) health; (iii) achievements; (iv) relationships; (v) safety; (vi) feeling part of community; (vii) future security CV3.4 Levels of physical health CV3.5 Levels of mental health	Human Health Aesthetics Equity Employment and income

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
		NB: Need to develop specific target for CV4	4	CV4 Community health/ wellbeing/ satisfaction associated with the Reef.	CV4.1 Reef contribution to overall Quality of Life CV4.1.1 Number of Traditional Owner benefit sharing initiatives CV4.2 Levels of optimism about the future of the Reef CV4.3 Levels of satisfaction with Reef experiences CV4.4 Influences on Reef experiences (negative and positive).	Access Understanding, appreciation and enjoyment Human health Personal connection Aesthetics Equity
		NB: Need to develop specific target for CV5	3.5	CV5 Regional services and service infrastructure supporting the interface between the community and Reef	CV5.1 Energy/water security CV5.2 Quality of infrastructure CV5.3 Impacts on infrastructure CV5.4 Perceptions of access to health, education, aged care and child care CV5.5 Perceptions of access to roads and public transport	Access
		NB: Need to develop specific target for ACS1	3.5	ACS1 Levels of community awareness and education about the Reef	ACS1.1 Regional education/skills levels ACS1.2 Levels of awareness of NRM issues ACS1.3 Levels of awareness of Reef and waterway condition and threats ACS1.4 Number/type of Reef learning opportunities	Understanding, appreciation and enjoyment



Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
<b>Community benefits</b> Access Aesthetics Understanding , appreciation and enjoyment Human health Personal connection Equity Empowerment Employment and income	CBO4: Local, regional and Reef-wide community benefits are understood and the community is actively engaged in managing Reef activities	CBT3: Community participation in stewardship actions to improve Reef health and resilience continues to grow.	3.5	ACS2 Levels of community capacity for stewardship	ACS2.1 Sense of responsibility towards the environment ACS2.2 Sense of responsibility towards the Reef and coastal waterways ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities ACS2.4 Numbers and types of Traditional Owner involvement in on-ground Water Quality improvement and monitoring	Understandi ng appreciatio n and enjoyment Personal connection Empowerm ent
		CBT4 Community benefit values for the Reef coastal ecosystems are being monitored and show a positive trend	Not enough evidence to rate with confidence	All of the above	ACS2.1 Sense of responsibility towards the environment ACS2.2 Sense of responsibility towards the Reef and coastal waterways ACS2.3 Regional Reef-based stewardship activities ACS2.4 Numbers and types of Traditional Owner involvement in on-ground water Quality (WQ) improvement and monitoring	Access Aesthetics Understandi ng, appreciatio n and enjoyment Human health Personal connection Equity Empowerm ent Employmen t and income

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
<b>Heritage</b> Indigenous and non-Indigenous heritage values are identified, protected, conserved and managed such that the heritage values maintain their significance for current and future generations	HO1: Traditional Owner's heritage rights and responsibilities are incorporated in all facets of management.	HT1: New and effective cooperative management practices are developed for protection and conservation of Reef Indigenous and Non-Indigenous Heritage	Not enough evidence to rate with confidence	CH2 Indigenous (Traditional Owner) heritage	CH2.2 (a) Number and strength of Traditional Owner connections with Reef resources including identification, protection and management of Indigenous cultural heritage in sea country CH2.3 Levels of Traditional Owner satisfaction with: (a) Identification, documentation and storage of cultural information; (b) Traditional Owner led methodologies; (c) participation in Reef management; (d) extent to which TEK is identified, maintained and transferred	Access Understanding appreciation and enjoyment Personal connection Equity Empowerment
		HT2: Indigenous and Non-Indigenous Heritage values are defined, documented and protected in decision-making and planning processes.	3	CH2 Indigenous (Traditional Owner) heritage	CH2.1 ID, state and trend of Indigenous heritage values. CH2.2 Traditional Owner management of Reef resources including number and strength of (b) Traditional Owner benefits/values derived from the Reef; (d) Traditional Owner-driven frameworks and participatory monitoring methods CH2.5 Impacts on Indigenous heritage	Access Understanding, appreciation and enjoyment Personal connection Equity Empowerment
			3	CH4 Historic maritime heritage	CH4.1 Identification, protection and management of Reef historic maritime heritage	Access Aesthetics Understanding,

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
					CH4.2 Cultural significance of historic heritage CH4.3 Impacts on historic maritime heritage values	appreciation and enjoyment Personal connection
	HO2 Indigenous and non-Indigenous heritage including natural, aesthetic, historic, scientific, and social values are identified, conserved and managed in partnership with the community. <b>Needs to be replaced with more specific objectives and targets for world heritage, historic maritime heritage and contemporary cultural heritage</b>	HT3: Partnerships between Traditional Owner and all stakeholders are increased to ensure key Reef heritage values are identified, documented and monitored.	Not enough evidence to rate with confidence	CH2 Indigenous (Traditional Owner) heritage	CH2.2 TO management of Reef resources including number and strength of (c) partnerships, institutional arrangements and agreements between Traditional Owners and all Reef stakeholders	Equity Empowerment
			Not enough evidence to rate with confidence	CH1 World Heritage – underpinned by ecosystem health, biodiversity and water quality	CH1.1 State of regional natural assets CH1.2 Perceptions of the Reef's aesthetic beauty CH1.3 Perceived impacts on the Reef's aesthetic beauty	Aesthetics Understanding, appreciation and enjoyment
			Not enough evidence to rate with confidence	CH2 Indigenous (Traditional Owner) heritage	CH2.1 ID, state and trend of Indigenous heritage values. CH2.2 Traditional Owner management of Reef resources including number and strength of (a) Traditional Owner connections with Reef resources incl. Identification, protection and management of Indigenous cultural heritage in sea country; (b) Traditional Owner benefits derived from the Reef; (c ) partnerships,	Access Understanding, appreciation and enjoyment Human health Personal connection Equity

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
					institutional arrangements and agreements between Traditional Owners and all Reef stakeholders; (d) Traditional Owner-driven frameworks and participatory monitoring methods	Empowerment
					CH3.1 Place attachment CH3.2 Identity CH3.3 Pride CH3.4 Personal connection to the Reef CH3.5 Impacts on contemporary culture	Access Aesthetics Understanding appreciation and enjoyment Personal connection
					CH4.1 Identification, protection and management of historic heritage in Reef environments CH4.2 Cultural significance of Reef historic heritage values CH4.3 Impacts on historic maritime heritage values	
<b>Biodiversity</b> The Reef maintains its diversity of species and ecological habitats in at least a good condition with a stable to	BO1 Traditional Owners are engaged and participate in and manage the conservation and sustainable use of cultural keystone species and biocultural resources.	BT1 Customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or cultural use requirements are formally	3	CH2 Indigenous (Traditional Owner) heritage	CH2.3 Levels of Traditional Owner satisfaction with: (a) Identification, documentation and storage of cultural information; (b) Traditional Owner led methodologies; (c) participation in Reef management; (d) extent to which Traditional Ecological Knowledge is identified, maintained and transferred	Access Understanding, appreciation and enjoyment Equity Empowerment

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
		improving trend.				recognised and adopted in management arrangements.
<b>Ecosystem Health</b> The status and ecological functions of ecosystems within the GBRWHA are in at least good condition with a stable to improving trend.	EHO1 The knowledge, innovations and practices of Traditional Owners relevant for conservation and cultural use of biocultural diversity are preserved and maintained.	EHT1 Traditional Owners have Traditional Ecological Knowledge management systems for collecting, handling and sharing culturally sensitive information, and integration in decision-making.	3	CH2 Indigenous (Traditional Owner) heritage	CH2.1 ID, state and trend of Indigenous heritage values. CH2.2(a) Number and strength of Traditional Owner connections with Reef resources incl. Identification, protection and management of Indigenous cultural heritage in sea country	Access Aesthetics Understanding, appreciation and enjoyment Personal connection Equity Empowerment
		EHT2 Number of agreements with Traditional Owners addressing management of ecosystems within their traditional estates is increased.	3	CH2 Indigenous (Traditional Owner) heritage	CH2.2(c) Number and strength of partnerships, institutional arrangements and agreements between Traditional Owners and all Reef stakeholders;	Equity Empowerment

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
<b>Ecosystem Health</b> The status and ecological functions of ecosystems within the GBRWHA are in at least good condition with a stable to improving trend	Need a specific objective	EHT4 Key direct human-related activities are managed to reduce cumulative impacts and achieve a net benefit for the Reef.		G2 Connectivity within and between key decision making institutions and sectors	G2.1 Number and type governance subdomains that counteract Reef 2050 Plan targets/action G2.2 Status of partnerships, inter-government arrangements	Equity Empowerment
			Not enough evidence to rate with confidence	EV3 Economic viability of Reef-dependent industries	EV3.1 Vulnerability of Reef-dependent industries EV3.2 Adaptive capacity of Reef-dependent industries	Access Aesthetics Understanding appreciation and enjoyment
			3.5	ACS2 Community capacity for stewardship	ACS2.1 Sense of responsibility towards the environment ACS2.2 Sense of responsibility towards the Reef and coastal waterways ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities ACS2.4 Numbers and types of Traditional Owner involvement in on-ground Water Quality improvement and monitoring	Access Understanding, appreciation and enjoyment Personal connection Empowerment
			Not enough evidence to	ACS3 Adoption of responsible/	ACS3.1 Extent and type of stewardship practices of Reef recreational users	Access Aesthetics

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
			rate with confidence	best practice – Reef recreational users	ACS3.2 Number of people visiting the Reef ACS3.3 Why people visit the Reef ACS3.4 Where people visit the Reef ACS3.5 What people do in the Reef ACS3.6 How people get to the Reef	Understanding appreciation and enjoyment Human health Personal connection Empowerment
<b>Ecosystem Health</b> The status and ecological functions of ecosystems within the GBRWHA are in at least good condition with a stable to improving trend			3.5	ACS4 Adoption of responsible/ best practice – Agricultural and land sector.	ACS4.1 Extent and type of stewardship practices of agricultural industries.	Access Aesthetics Understanding appreciation and enjoyment Human health Personal connection Empowerment
			3.5	ACS5 Adoption of responsible/ best practice – Industry and urban sector.	ACS5.1 Extent and type of stewardship practices of urban councils and industries.	Access Aesthetics Understanding appreciation and enjoyment

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
						Human health Personal connection Empowerment
			3.5	ACS6 Adoption of responsible/ best practice – Marine industries.	ACS6.1 Extent and type of stewardship practices of Reef-associated industries ACS6.2 Arrangements to ensure shipping in the Great Barrier Reef is safe. ACS6.3 Number of shipping accidents ACS6.4 Extent to which ports and shipping apply 'best practice' principles ACS6.5 Extent and type of stewardship practices of Reef-based tourism ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing	Access Aesthetics Understanding, appreciation and enjoyment Human health Personal connection Equity Empowerment
<b>Governance</b> The outstanding universal value of the Reef is maintained and	GO1 Governance arrangements support effective implementation review and maintenance of this Plan	GT1 Implementation, reporting and review of this Plan are based on the principles of transparency, ownership,	Not enough evidence to rate with confidence	G2 Connectivity within and between key decision making institutions and sectors	G2.1 No./ type governance subdomains (or policy areas) that counteract Reef 2050 Plan targets/action G2.2 Status of partnerships, inter-governmental arrangements	Equity Empowerment



Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
enhanced each successive decade through effective governance arrangements and coordinated management activities.		accountability, responsiveness and the strong involvement of Traditional Owners, industry, researchers and the community.			G2.3 Levels of transparency, ownership, accountability, responsiveness G2.4 Inter-generational equity in Reef-related decision-making G2.5 Intra-generational equity in Reef-related decision-making	
		GT2 The visions, outcomes objectives and targets in this Plan are taken into account in relevant regulation, documents, policies and strategies of all levels of government	Not enough evidence to rate with confidence	G1 Strategic focus of governance system	G1.1 No./ type of opportunities for improved Reef 2050 Plan governance	Equity Empowerment
	GO2 This Plan guides decisions about the Reef made by governments industry and the community.	GT3 Actions under this Plan are prioritised and tailored to reflect local or regional differences in threats to the values of the Reef.	Not enough evidence to rate with confidence	G3 Adaptive governance capacity of key decision making institutions and sectors.	G3.4 Sectoral/community contributions to decision-making	Equity Empowerment
	GO2 This Plan guides decisions about the Reef made by	GT4 Investment in actions is prioritised using	Not enough evidence to	G1 Strategic focus of	G1.2 No./severity of system-wide problems for delivery of key Reef 2050 Plan targets	Equity Empowerment

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
	governments industry and the community.	evidence-based risk assessment to maximise benefits for Reef health and resilience.	rate with confidence	governance system		
	GO3 Strong partnerships with Traditional Owners, industry, researchers and community support protection and management of the Reef.		Not enough evidence to rate with confidence	G2 Connectivity within and between key decision making institutions and sectors	G2.2 Status of partnerships, inter-government arrangements	Equity Empowerment
	GO4 An adaptive management approach underpins implementation of this Plan and results in governance arrangements and processes.	GT5 A comprehensive Integrated Monitoring and Reporting Program is established and operational and the reporting informs the review and updating of this Plan.	Not enough evidence to rate with confidence	G4 Adaptive use and management of integrated knowledge.	G4.1 Availability of integrated knowledge sets to decision-makers G4.2 Extent to which integrated knowledge sets are used in decision-making G4.3 Management of integrated knowledge sets	Equity Empowerment
<b>Economic Benefits</b> Economic activities within the GBRWHA and its	EBO1 Traditional Owners derive economic benefits from conservation and sustainable use of biological resources	EBT1 There is an increase in the number of Traditional Owner service providers and viable businesses	Not enough evidence to rate with confidence	EV5 Workforce participation and employment	EV5.2.1 No. employment opportunities for Traditional Owners in Reef sea-country management EV5.2.2 No. employment opportunities for Traditional Owners in Reef-based industries.	Equity

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
catchments sustain the Reef's outstanding universal value		EBT2 Number of employment opportunities for Traditional Owners in sea country management and Reef-based industries is increased.	Not enough evidence to rate with confidence	EV5 Workforce participation and employment	EV5.2.1 Number of employment opportunities for Traditional Owners in Reef sea-country management EV5.2.2 No. employment opportunities for Traditional Owners in Reef-based industries.	Equity Employment and income
	EBO2 Protecting Reef's OUV is embedded within decision making, with impacts first avoided, then mitigated and then as a final consideration, any residual impacts are offset to achieve a net environmental benefit.	EBT3 Cumulative impacts on the Reef from human activities are understood, and measures to ensure a net environmental benefit approach for the Reef are in place.	Not enough evidence to rate with confidence	Same as for EHT4 Key direct human-related activities are managed to reduce cumulative impacts and achieve a net benefit for the Reef.		Understanding appreciation and enjoyment Equity
	EBO3 Reef-associated industries are planned and managed in such a way as to protect the Reef's outstanding universal value and are sustainable,	EBT4 Shipping in the Reef is safe, risks are minimised and incidents are reduced to as close to zero as possible.	3.5	EV2 Economic viability of Reef-associated industries	ACS6.1 Extent and type of stewardship practices of Reef-associated industries (e.g. ports and shipping) ACS6.2 Arrangements to ensure Reef shipping is safe ACS6.3 Number of shipping accidents	Access Aesthetics Equity

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
	productive and profitable				ACS6.4 Extent to which ports and shipping apply 'best practice' principles	
		NB: Need to develop specific target		EV2 Economic viability of Reef-associated industries	EV2.1 Economic viability of mining and minerals	Access Aesthetics Equity
<b>Economic Benefits</b> Economic activities within the GBRWHA and its catchments sustain the Reef's outstanding universal value	EBO3 Reef-associated industries are planned and managed in such a way as to protect the Reef's outstanding universal value and are sustainable, productive and profitable	NB: Need to develop specific target	3.5	ACS4 Adoption of responsible/ best practice – Agricultural and land sector.	ACS4.1 Extent and type of stewardship practices of agricultural industries.	Access Aesthetics Understanding, appreciation and enjoyment Human health Personal connection Empowerment
		NB: Need to develop specific target	3.5	ACS5 Adoption of responsible/ best practice – Industry and urban sector.	ACS5.1 Extent and type of stewardship practices of urban councils and industries.	Access Aesthetics Understanding, appreciation and enjoyment Human health

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
						Personal connection Empowerment
		NB: Need to develop specific target	3.5	ACS6 Adoption of responsible/ best practice – Marine industries.	ACS6.1 Extent and type of stewardship practices of Reef-associated industries (e.g. ports and shipping) ACS6.2 Arrangements to ensure Reef shipping is safe. ACS6.3 Extent to which ports and shipping apply 'best practice' principles.	Access Aesthetics Understanding, appreciation and enjoyment Human health Personal connection Empowerment
	EBO4 Reef-dependent industries are productive and profitable based on a healthy Reef and are ecologically sustainable.	EBT5 The relationship between Reef health and the viability of Reef-dependent industries (e.g. tourism and fishing) is understood and considered in planning and	Not enough evidence to rate with confidence	EV3 Economic viability of Reef-dependent industries	EV3.1 Vulnerability of Reef-dependent industries EV3.2 Adaptive capacity of Reef-dependent industries EV3.3 Economic viability of Reef-tourism EV3.4 Economic viability of Reef-commercial fishing	Access Aesthetics Understanding, appreciation and enjoyment Human health Personal connection
			Not enough evidence to rate with confidence	ACS6 Adoption of responsible/ best practice –	ACS6.5 Extent and type of stewardship practices of Reef-based tourism	

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
		development decisions. Target could be broken down		Marine industries.	ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing	Empowerment
		EBT5 Levels of understanding and consideration in planning	Not enough evidence to rate with confidence	G4 Adaptive use and management of integrated knowledge.	G4.1 Availability of integrated knowledge sets to decision-makers G4.2 Extent to which integrated knowledge sets are used in decision-making G4.3 Management of integrated knowledge sets	Understanding, appreciation and enjoyment Equity Empowerment
		Need an economic Objective to reflect attributes EV.1, EV.4, EV.5, EV.6 and their associated indicators		EV1, EV2, EV3, EV4, EV5, EV6		All values
	Need a Water Quality Objective to reflect this attribute	WQT5 Traditional Owners, industry and community are engaged in on-ground water quality improvement and monitoring	Not enough evidence to rate with confidence	ACS2 Community capacity for stewardship	ACS2.4 Numbers and types of Traditional Owner involvement in on-ground water Quality improvement and monitoring	Understanding, appreciation and enjoyment Empowerment

Reef 2050 Plan Theme	Reef 2050 Plan Objective	Reef 2050 Plan Target	Proposed rating for target (based on Burnett Mary only)	Attributes (metrics)	Human Dimension Indicators	Value
successive decade						



Table 14 lists critically important data sources/programs/activities that are not yet undertaken **at all** for the whole Great Barrier Reef, but which are critically important for filling data gaps.

**Table 14. Critical programs/data sources/activities that are not yet undertaken for the whole Great Barrier Reef.**

Source of potential and/or existing data	Indicator clusters					Institution(s) that could potentially fill data gap
	A C S	C V	C H	E V	G	
Indigenous-led indicators	x	x	x	X	x	RIMReP process; research institutions
Site specific aesthetics monitoring	x	x	x	X	x	GU and CSIRO (NESP projects)
Recreation Index	x	x	x	X	x	Uni – CQU (currently Gladstone Harbour only)
Human use patterns – where, when, how	x	x	x	X	x	Uni- GU (Big Data analytics)

Table 15 lists critically important data sources/programs/activities that are **not systematically undertaken** for the whole Reef, but which are critically important for filling data gaps.

**Table 15. Critical programs/data sources/activities not yet systematically undertaken for the whole Great Barrier Reef and catchment.**

Source of potential and/or existing data	Indicator clusters					Institution	Website <sup>23</sup>
	A C S	C V	C H	E V	G		
Stewardship	x	x		x	x	QDEHP; the Authority; CSIRO	<a href="http://healthyriverstoReef.org.au/wp-content/uploads/2016/05/Stewardship-Scoring-Methods-and-Results-Pilot-Report-Card.pdf">http://healthyriverstoReef.org.au/wp-content/uploads/2016/05/Stewardship-Scoring-Methods-and-Results-Pilot-Report-Card.pdf</a> ; <a href="http://seltmp.eatlas.org">http://seltmp.eatlas.org</a> .

<sup>23</sup> Not an exhaustive list



Source of potential and/or existing data	Indicator clusters					Institution	Website <sup>23</sup>
	A C S	C V	C H	E V	G		
							<a href="#">au/seltmp; Reef-Guardian-Councils-Highlight-Report-2015-2016</a>
Wellbeing	x	x	X	x		CSIRO (SELTMP)	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a>
Reef - use and dependency	x	x	X	x	x	CSIRO (SELTMP)	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a>
Perceptions of Reef and its management	x	x	X		x	CSIRO (SELTMP)	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a>
Benchmarking – HD and Gov	x	x	X	x	x	NESP 3.2.2; RIMReP	N/A
Historic heritage	x	x	X		x	QDEHP; the Authority	<a href="http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3235/1/Historic-heritage-assessment-Maritime-Cultural-Heritage-Guideline.pdf">http://elibrary.Reefmpa.gov.au/jspui/bitstream/11017/3235/1/Historic-heritage-assessment-Maritime-Cultural-Heritage-Guideline.pdf</a>
Indigenous Heritage	x	x	X	x	x	Qld Govt	<a href="https://data.qld.gov.au/dataset/cultural-heritage-aboriginal-and-torres-strait-islander-parties-list/resource/cd186b4f-b4bc-4c84-81fd-13b5d4698a0e">https://data.qld.gov.au/dataset/cultural-heritage-aboriginal-and-torres-strait-islander-parties-list/resource/cd186b4f-b4bc-4c84-81fd-13b5d4698a0e</a>
Reef experimental ecosystem account	x	x		x		ABS	<a href="http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4680.0.55.001Main%20Features202015?opendocumentandtabname=Summaryandprodno=4680.0.55.001andissue=2015andnum=andview=">http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4680.0.55.001Main%20Features202015?opendocumentandtabname=Summaryandprodno=4680.0.55.001andissue=2015andnum=andview=</a>

The gap analysis enabled the project team to classify data sources/programs/activities which are desirable and have readily available data sets for successful assessment and monitoring of the Reef's human dimensions. Desirable programs/data sources/activities listed in Table 16 have specific relevant data sets which need to be extracted for Reef human dimensions monitoring and assessment. Extra on-going funding is required for this task. Data sources/programs/activities listed in Table 17 are those which routinely produce freely available, relevant data sets, and are expected to do so into the future. No extra funding is required

**Table 16. Desirable programs/data sources/activities with readily available data sets, but data need to be extracted or programs extended (and therefore costed) for Great Barrier Reef human dimensions monitoring and assessment.**

Source of potential and/or existing data	Indicator clusters					Institution/s	Website -not exhaustive
	A C S	C V S	C F V	E V	C		
Analysis coast guard data	x	x	x			Regional coast guard organisations;	N/A
Analysis of QPWS camping data	x	x	x			QPWS	<a href="https://data.qld.gov.au/dataset/camping-and-vehicle-permits/resource/c1d1ff63-ebe4-49e7-8dd5-41be0dbf6948">https://data.qld.gov.au/dataset/camping-and-vehicle-permits/resource/c1d1ff63-ebe4-49e7-8dd5-41be0dbf6948</a>
Media tracking and analysis	x	x	x	x	x	the Authority; State govt dept offices; CSIRO (SELTMP); JCU	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a> ; Max Newlands??
Commercial fisheries data	x	x	x	x	x	QDAF; FRDC; CSIRO (SELTMP)	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a> ; <a href="http://www.frdc.com.au/">http://www.frdc.com.au/</a>
Compliance – land and sea	x	x				the Authority/QEHP	N/A
Vessel registration - commercial		x		x	x	AMSA	<a href="https://www.amsa.gov.au/vessels-operators/ship-registration/list-registered-ships">https://www.amsa.gov.au/vessels-operators/ship-registration/list-registered-ships</a>
Tourism Trends – Reef		x	x	x		CQU (Cairns); the Authority; EMC data; CSIRO (SELTMP)	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a> ; <a href="http://eatlas.org.au/data/uuid/d0ac609b-490e-47be-a857-4c7fc3775801">http://eatlas.org.au/data/uuid/d0ac609b-490e-47be-a857-4c7fc3775801</a> ; <a href="https://secure.Reefmpa.gov.au/EMC/About.aspx">https://secure.Reefmpa.gov.au/EMC/About.aspx</a>
MIPs – social surveys	x				x	State govt; NRMs	N/A – not yet completed
Stewardship - understanding behaviour change	x					NESP 2.1.3; CSIRO (SELTMP)	<a href="http://seltmp.eatlas.org.au/seltmp">http://seltmp.eatlas.org.au/seltmp</a> ; <a href="http://nesptropical.edu.au/index.php/round-2-projects/project-2-1-3/">http://nesptropical.edu.au/index.php/round-2-projects/project-2-1-3/</a>

Source of potential and/or existing data	Indicator clusters					Institution/s	Website -not exhaustive
	A C S	C V	C F	E V	C		
Recreational fishing data	x	x	x	x	x	QDAF; Infofish (Bill Sawynock); rec fishing clubs; FRDC	<a href="https://www.daf.qld.gov.au/fisheries/monitoring-our-fisheries/recreational-fisheries/statewide-and-regional-recreational-fishing-survey">https://www.daf.qld.gov.au/fisheries/monitoring-our-fisheries/recreational-fisheries/statewide-and-regional-recreational-fishing-survey</a> ; <a href="http://infofishaustralia.com.au/">http://infofishaustralia.com.au/</a> ; <a href="http://www.frdc.com.au/">http://www.frdc.com.au/</a> ; <a href="https://data.qld.gov.au/dataset/recreational-survey-by-fishing-region-comparison-of-2000-and-2010-surveys">https://data.qld.gov.au/dataset/recreational-survey-by-fishing-region-comparison-of-2000-and-2010-surveys</a> ; <a href="https://data.qld.gov.au/dataset/recreational-survey-2010-catch-release-retained-all-species/resource/0c0ea940-d6d2-4a58-a3f5-935d4c0bba12">https://data.qld.gov.au/dataset/recreational-survey-2010-catch-release-retained-all-species/resource/0c0ea940-d6d2-4a58-a3f5-935d4c0bba12</a>

**Table 17. Desirable programs/data sources/activities regularly undertaken with freely available data sets.**

Source of potential and/or existing data	Indicator clusters					Institution	Website <sup>24</sup>
	A C S	C V	C H	E V	C		
Census Data	x	x		x		ABS	<a href="http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Census?opendocument&amp;ndref=topBar">http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Census?opendocument&amp;ndref=topBar</a>
Qld. Land Account	x	x	x		x	ABS	<a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4609.0.55.0032011%20-%202016?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4609.0.55.0032011%20-%202016?OpenDocument</a>
Regional community profiles	x	x		x		ABS; QGSO; UNSW (Rental Vulnerability Index)	<a href="http://stat.abs.gov.au/itt/r.jsp?databyregion">http://stat.abs.gov.au/itt/r.jsp?databyregion</a> <a href="http://statistics.qgso.qld.gov.au/">http://statistics.qgso.qld.gov.au/</a> <a href="https://cityfutures.be.unsw.edu.au/cityviz/rental-vulnerability-index/">https://cityfutures.be.unsw.edu.au/cityviz/rental-vulnerability-index/</a>
Regional wellbeing Surveys	x	x	x	x		Uni of Canberra;	<a href="http://www.regionalwellbeing.org.au/">http://www.regionalwellbeing.org.au/</a>
Catchment Scale Land Use	x			x	x	QSpatial; ABARES	<a href="http://qldspatial.information.qld.gov.au;">http://qldspatial.information.qld.gov.au;</a> <a href="http://www.agriculture.gov.au/abares/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_luausq9abl20160616_11a.xml">http://www.agriculture.gov.au/abares/display?url=http://143.188.17.20/anrdl/DAFFService/display.php%3Ffid%3Dpb_luausq9abl20160616_11a.xml</a>
Agricultural datasets	x			x	x	ABARES	<a href="http://www.agriculture.gov.au/abares/data">http://www.agriculture.gov.au/abares/data</a>
Tourism trends – Australia				x		TRA (Tourism Research Aust.)	<a href="https://www.tra.gov.au/">https://www.tra.gov.au/</a>

<sup>24</sup> Not an exhaustive list

Source of potential and/or existing data	Indicator clusters					Institution	Website <sup>24</sup>
	A C S	C V	C H	E V	C		
Tourism Trends - Queensland				x		Tourism Queensland	<a href="https://teq.queensland.com/research-and-insights/domestic-research/regional-tourism-satellite-accounts">https://teq.queensland.com/research-and-insights/domestic-research/regional-tourism-satellite-accounts</a>
Vessel registration – recreational					x	the Authority; QDT and MR	<a href="http://www.Reefmpa.gov.au/VesselRegistrations/">http://www.Reefmpa.gov.au/VesselRegistrations/</a>
Regional economic surveys				x		Regional Chambers of commerce; LGAs	Various CoC and LGA websites
Fishery monitoring data	x	x			x	QDAF	<a href="https://data.qld.gov.au/dataset/fishery-monitoring-data/resource/743681ed-53a0-41ef-9392-9cc5cd2cdcfc">https://data.qld.gov.au/dataset/fishery-monitoring-data/resource/743681ed-53a0-41ef-9392-9cc5cd2cdcfc</a>
Queensland Aquaculture Production from 1995 to 2015				x		QDAF	<a href="https://data.qld.gov.au/dataset/queensland-aquaculture-production-1995-2015/resource/0629abbc-ee4f-4e41-87c7-62f0591ae5bc">https://data.qld.gov.au/dataset/queensland-aquaculture-production-1995-2015/resource/0629abbc-ee4f-4e41-87c7-62f0591ae5bc</a>
Queensland Commercial Fishery data	x	x		x	x	QDAF	<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-observer-data/resource/2e6d2c6e-4ea1-4b00-aaaa-5c4480e1ea2a">https://data.qld.gov.au/dataset/queensland-commercial-fishery-observer-data/resource/2e6d2c6e-4ea1-4b00-aaaa-5c4480e1ea2a</a> ; <a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-line/resource/5290c7a1-506a-4c04-9c65-d74baa6cafb0">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-line/resource/5290c7a1-506a-4c04-9c65-d74baa6cafb0</a> ; <a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/6918e93a-c65e-40b0-bffa-74b22d05f930">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/6918e93a-c65e-40b0-bffa-74b22d05f930</a> ; <a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/1c45a387-0eaf-4f2a-a8b1-5b043585806f">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/1c45a387-0eaf-4f2a-a8b1-5b043585806f</a> ; <a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/1c45a387-0eaf-4f2a-a8b1-5b043585806f">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-trawl-beam-otter/resource/1c45a387-0eaf-4f2a-a8b1-5b043585806f</a>

Source of potential and/or existing data	Indicator clusters					Institution	Website <sup>24</sup>
	A C S	C V S	C H V	E V	C		
							<a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-pot/resource/025472a0-1a46-4392-837c-33e3f05ff014">fishery-catch-and-effort-annual-totals-pot/resource/025472a0-1a46-4392-837c-33e3f05ff014</a> ; <a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-net">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-net</a> ; <a href="https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-charter/resource/1db4e748-5574-4b28-827a-49e7686849b8">https://data.qld.gov.au/dataset/queensland-commercial-fishery-catch-and-effort-annual-totals-charter/resource/1db4e748-5574-4b28-827a-49e7686849b8</a>
Monitoring of sewage	x	x			x	QSpatial	<a href="https://data.qld.gov.au/dataset/soe2015-volume-and-load-of-sewage-treatment-plants/resource/indicator-3-2-0-4">https://data.qld.gov.au/dataset/soe2015-volume-and-load-of-sewage-treatment-plants/resource/indicator-3-2-0-4</a> ; <a href="http://qldspatial.information.qld.gov.au">http://qldspatial.information.qld.gov.au</a>
Marine pollution—2002 to 2016	x	x	x		x	Qld. Gov.	<a href="https://data.qld.gov.au/dataset/marine-oil-spills-data/resource/280b7e6e-61b5-4502-b365-96bafea2950a">https://data.qld.gov.au/dataset/marine-oil-spills-data/resource/280b7e6e-61b5-4502-b365-96bafea2950a</a>
Maritime Safety Queensland series	x	x			x	Qspatial	<a href="https://data.qld.gov.au/dataset/maritime-safety-queensland-series">https://data.qld.gov.au/dataset/maritime-safety-queensland-series</a>

**Table 18. Framework for deriving priority indicator sets for bench-marking**

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
<b>All seven themes</b> (i.e., economic benefits, community benefits, heritage, governance, water quality, biodiversity and ecosystem health).	<b>Aspirations, capacity and stewardship</b> (ACS). Cohesive vision and aspirations for the future of the Reef together with awareness, skills, knowledge and capacities to turn aspirations into action. Personal and collective (including industry) efforts to: (a) minimise impacts on the Great Barrier Reef and catchment; (b) restore degraded marine, coastal and catchment ecosystems; (c) apply ecologically sustainable development principles; and (d) be actively involved in Great Barrier Reef and catchment management.	ACS1 Levels of community awareness and education about the Reef	ACS1.1 Regional education/skills levels ACS1.2 Levels of awareness of NRM issues ACS1.3 Levels of awareness of Reef and waterway condition and threats ACS1.4 Number/type of Reef learning opportunities	ACS1.3 Levels of awareness of threats to the Great Barrier Reef and its catchment
		ACS2 Community capacity for stewardship	ACS2.1 Sense of responsibility towards the environment ACS2.2 Sense of responsibility towards the Reef and coastal waterways ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities ACS2.4 Numbers and types of Traditional Owner involvement in on-ground Water Quality improvement and monitoring	ACS2.2 Sense of responsibility towards the Reef and catchment waterways ACS2.3 Numbers of individuals and groups participating in Reef and catchment stewardship activities ACS2.4 Numbers and types of Traditional Owners, industries and communities engaged in on-ground water quality improvement and monitoring
		ACS3 Adoption of responsible/ best practice –Reef recreational users	ACS3.1 Extent and type of stewardship practices of Reef recreational users ACS3.2 Number of people visiting the Reef ACS3.3 Why people visit the Reef ACS3.4 Where people visit the Reef ACS3.5 What people do in the Reef ACS3.6 How people get to the Reef	ACS3.1 Extent and type of stewardship practices of Reef recreational users ACS3.2 Number of people visiting the Reef ACS3.3 Why people visit the Reef ACS3.4 Where people go in the Reef ACS3.5 What people do in the Reef ACS3.6 How people get to the Reef

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
		ACS4 Adoption of responsible/ best practice – Agricultural and land sector	ACS4.1 Extent and type of stewardship practices of agricultural industries	ACS4.1 Extent and type of stewardship practices of ag. industries
		ACS5 Adoption of responsible/ best practice – Industry and urban sector	ACS5.1 Extent and type of stewardship practices of urban councils and industries	ACS5.1 Extent and type of stewardship practices of urban councils and industries
		ACS6 Adoption of responsible/ best practice – Marine industries	ACS6.1 Extent and type of stewardship practices of Reef-associated industries (e.g. ports and shipping) ACS6.2 Arrangements to ensure shipping in the Reef is safe ACS6.3 Number of shipping accidents in the Reef ACS6.4 Extent to which ports and shipping apply 'best practice' principles ACS6.5 Extent and type of stewardship practices of Reef-based tourism ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing	ACS6.1 Extent and type of stewardship practices of Reef-associated industries ACS6.2 Arrangements to ensure shipping in the Great Barrier Reef is safe. ACS6.3 Number of shipping accidents ACS6.4 Extent to which ports and shipping apply 'best practice' principles ACS6.5 Extent and type of stewardship practices of Reef-based tourism ACS6.6 Extent and type of stewardship practices of Reef-dependent commercial fishing



Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
<b>Community benefits</b> An informed community that plays a role in protecting the Reef for the benefits a healthy Reef provides for current and future generations.	<b>Community Vitality (CV).</b> Characterised by demographic stability, security, happiness and well-being. Community vitality associated with the Reef includes how and why people access, use and value the Reef; services and infrastructure supporting the interface between the community and the Reef; and the social health derived from the Great Barrier Reef, e.g. nature appreciation, relaxation, recreation, physical health benefits, and other lifestyle benefits derived from the Great Barrier Reef. A healthy Reef community derives high levels of appreciation and enjoyment from the Reef and is highly satisfied with the Reef and its management.	CV1 Demographic stability across the catchment	CV1.1 Basic demographic characteristics (e.g. population, age structure, migration and growth rates) CV1.2 Migration intentions over the next 12 months	
		CV2 Security in the catchment including housing, safety and risk management	CV2.1 Financial distress: (i) delay or cancel non-essential purchases; (ii) could not pay bills on time; (iii) went without meals, or unable to heat or cool home; (iv) asked for financial help from friends or family CV2.2 Crime rates CV2.3 Perceptions of safety CV2.4 Housing including availability and affordability	
		CV3 Wellbeing/happiness within the general community	CV3.1 Community wellbeing (1-7): (i) place to live, (ii) coping with challenges, (iii) pride, (iv) optimism, (v) community spirit CV3.2 Decreasing community liveability: (i) liveability; (ii) friendliness; (iii) local economy; (iv) local landscape CV3.3 Personal Wellbeing (0-100). Satisfaction with: (i) standard of living; (ii) health; (iii) achievements; (iv) relationships; (v) safety; (vi) feeling part of community; (vii) future security CV3.4 Levels of physical health CV3.5 Levels of mental health	

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
		CV4 Community health/ wellbeing/ satisfaction associated with the Reef	CV4.1 Reef contribution to overall Quality of Life CV4.1.1 Number of Traditional Owner benefit sharing initiatives CV4.2 Levels of optimism about the future of the Reef CV4.3 Levels of satisfaction with Reef experiences CV4.4 Influences on Reef experiences (negative and positive)	CV4.1 Reef contribution to overall Quality of Life CV4.1.1 Number of Traditional Owner benefit sharing initiatives CV4.2 Levels of optimism about the future of the Reef CV4.3 Levels of satisfaction with Reef experiences CV4.4 Influences on Reef experiences (negative and positive)
		CV5 Regional services and service infrastructure supporting the interface between the community and Great Barrier Reef	CV5.1 Energy/water security CV5.2 Quality of infrastructure CV5.3 Impacts on infrastructure CV5.4 Perceptions of access to health, education, aged care and child care CV5.5 Perceptions of access to roads and public transport	
<b>Heritage</b> Indigenous and non-Indigenous heritage values are	<b>Culture and Heritage (CH).</b> Status of integrated and diverse culture and heritage associated with the Great Barrier Reef	CH1 World Heritage – underpinned by ecosystem health, biodiversity and water quality	CH1.1 State of regional natural assets CH1.2 Perceptions of the Reef's aesthetic beauty CH1.3 Perceived impacts on the Reef's aesthetic beauty	CH1.2 Perceptions of the Reef's aesthetic beauty CH1.3 Perceived impacts on the Reef's aesthetic beauty

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
identified, protected, conserved and managed such that the heritage values maintain their significance for current and future generations.	catchment. Cultural and heritage connections promote a sense of place associated with Great Barrier Reef coastal communities, and there is a strong sense of place attachment and identity associated with the community, because of its association with the Reef. This cluster also includes values of significance in accordance with Traditional Owner practices, observances, customs, traditions, beliefs or history. Historic heritage is specifically concerned with the occupation and use of an area since the arrival of European and other migrants. There are 4 major attributes associated with this cluster: natural heritage; Indigenous heritage;	CH2 Indigenous (TO) heritage	CH2.1 ID, state and trend of Indigenous heritage values CH2.2 Traditional Owner management of Reef resources including number and strength of: (a) Traditional Owner connections with Reef resources incl. identification, protection and management of Indigenous cultural heritage in sea country; (b) Traditional Owner benefits derived from the Reef; (c) partnerships, institutional arrangements and agreements between Traditional Owners and all Reef stakeholders; (d) Traditional Owner-driven frameworks and participatory monitoring methods CH2.3 Levels of Traditional Owner satisfaction with: (a) identification, documentation and storage of cultural information; (b) Traditional Owner-led methodologies; (c) participation in Reef management; (d) extent to which Traditional Ecological Knowledge (TEK) is identified, maintained and transferred CH2.4 Levels of Traditional Owner use and dependency on the Reef CH2.5 Impacts on Indigenous heritage	CH2.1 Identification, state and trend of Indigenous heritage values.  CH2.2 Number and strength of (a) Traditional Owner connections with Reef resources including identification, protection and management of Indigenous cultural heritage in sea country; (b) Traditional Owner benefits from the Reef; (c) partnerships, institutional arrangements and agreements between Traditional Owners and all Reef stakeholders; (d) Traditional Owner-driven frameworks and participatory monitoring methods. CH2.3 Levels of Traditional Owner satisfaction with: (a) Identification, documentation and storage of cultural information; (b) Traditional Owner-led methodologies; (c) participation in Reef management; (d) extent to which Traditional Ecological Knowledge is identified, maintained and transferred

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
	contemporary culture; historic cultural heritage.	CH3 Contemporary culture	CH3.1 Place attachment associated with the Reef CH3.2 Identity associated with the Reef CH3.3 Pride in the Reef CH3.4 Personal connection to the Reef CH3.5 Impacts on contemporary culture	CH3.1 Place attachment associated with the Reef CH3.2 Identity associated with the Reef CH3.3 Pride in the Reef CH3.4 Personal connection to the Reef
		CH4 Historic maritime heritage	CH4.1 Identification, protection and management of Great Barrier Reef historic maritime heritage CH4.2 Cultural significance of historic maritime heritage values for the Reef CH4.3 Impacts on historic maritime heritage values	CH4.1 Identification, protection and management of historic maritime heritage in the Reef's environments
<b>Economic Benefits</b> Economic activities within the World Heritage Area and its catchments sustain the Reef's	<b>Economic values (EV).</b> Monetary and non-monetary advantages that people derive directly or indirectly from a healthy and well-managed Great Barrier Reef. Fundamental is the premise that economic activities within the World	EV1 Size and diversity of regional economic growth EV2 Economic viability of Reef-associated industries	EV1.1 Gross Regional Product EV1.2 Core industries – size and type EV2.1 Economic viability of Mining and minerals EV2.2 Economic viability of Ports and shipping EV2.3 Economic viability of Agriculture EV2.4 Economic viability of Urban industries	

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
outstanding universal value.	Heritage Area and its catchments are ecologically sustainable. Reef-dependent industries rely on a healthy Reef and include Reef-based commercial fishing, tourism, recreation, research and Traditional Owner use. Reef-associated industries include industries that may impact on the Great Barrier Reef, but are not economically dependent on Reef health, e.g. shipping, catchment industries such as agriculture, urban development, port development.	EV3 Economic viability of Reef-dependent industries	EV3.1 Vulnerability of Reef-dependent industries EV3.2 Adaptive capacity of Reef-dependent industries EV3.3 Economic viability of Reef-tourism EV3.4 Economic viability of Reef-commercial fishing	EV3.1 Vulnerability of Reef-dependent industries EV3.2 Adaptive capacity of Reef-dependent industries EV3.3 Economic viability of Reef-tourism EV3.4 Economic viability of Reef-commercial fishing
		EV4 Inclusiveness and economic fairness/ equity	EV4.1 Income – personal and household EV4.2 Equity between and within industries/ activities.	
		EV5 Workforce participation and employment	EV5.1 Regional employment participation rates and trends EV5.2 Reef-related employment EV5.2.1 No. employment opportunities for Traditional Owners in Reef sea-country management EV5.2.2 No. employment opportunities for Traditional Owners in Reef-based industries	EV5.2.Reef-related employment EV5.2.1 Number of employment opportunities for Traditional Owners in Reef sea-country management EV5.2.2 Number of employment opportunities for Traditional Owners in Reef-based industries
		EV6. Economic confidence within the region	EV6.1 Regional economic confidence EV6.2 Confidence in Reef industries	
<b>Governance</b> The outstanding universal value of the Reef is	<b>Governance (G).</b> The health of Reef-based decision-making systems (from local to international scales), including levels of	G1 Strategic focus of governance system	G1.1 No./ type of opportunities for improved Reef 2050 Plan governance G1.2 No./severity of system-wide problems for delivery of key Reef 2050 Plan targets	G1.1 Number and type of opportunities for improved Reef 2050 Plan Governance G1.2 Number and severity of system-wide problems for delivery of key Reef 2050 Plan targets

Reef 2050 Plan Theme	Human Dimension Clusters	Human Dimension Attributes	Key Indicator Sets	Priority Indicator Sets
maintained and enhanced each successive decade through effective governance arrangements and coordinated management activities.	connectivity between different parts of the governance system, effective use of diverse knowledge sets and system capacity for effective action. Also includes viability of institutional arrangements; community participation in Reef management; and use of strong principles in planning and management.	G2 Connectivity within and between key decision making institutions and sectors in the system	G2.1 No./ type governance subdomains (or policy areas) that counteract Reef 2050 Plan targets/action G2.2 Status of partnerships, inter-governmental arrangements G2.3 Levels of transparency, ownership, accountability, responsiveness G2.4 Inter-generational equity in Reef-related decision-making G2.5 Intra-generational equity in Reef-related decision-making	G2.1 Number and type governance subdomains that counteract Reef 2050 Plan targets/action G2.2 Status of partnerships, inter-government arrangements
		G3 Adaptive governance capacity of key decision making institutions and sectors in the system	G3.1 Levels of integrated strategy development and delivery design G3.2 Support for management G3.3 Confidence in management G3.4 Sectoral/community contributions to decision-making	G3.2 Support for management G3.3 Community confidence in management G3.4 Sectoral/community contributions to decision-making
		G4 Adaptive use and management of integrated knowledge sets in the system.	G4.1 Availability of integrated knowledge sets to decision-makers G4.2 Extent to which integrated knowledge sets are used in decision-making G4.3 Management of integrated knowledge sets	G4.1 Availability of integrated knowledge sets to decision-makers G4.2 Extent to which integrated knowledge sets are used in decision-making G4.3 Management of integrated knowledge sets