National Environmental Research Program

TROPICAL ECOSYSTEMS hub

Technical Report

What do residents and tourists 'value' most in the GBRWHA?

Project 10-2 Interim report on residential and tourist data collection activities including descriptive data summaries

Natalie Stoeckl, Marina Farr and Hana Sakata

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

Reef & Rainforest RESEARCH CENTRE

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Australian Government
Department of the Environment

Supported by the Australian Government's
National Environmental Research Program

Project 10.2 Socioeconomic systems and reef resilience

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Australian Government
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National Library of Australia Cataloguing-in-Publication entry:

978-1-925088-01-4

This report should be cited as:

Stoeckl, N., Farr, M., and Sakata, H., (2013) *What do residents and tourists 'value' most in the GBRWHA? Project 10-2 Interim report on residential and tourist data collection activities including descriptive data summaries.* Report to the National Environmental Research Program. Reef and Rainforest Research Centre Limited, Cairns (pp. 112).

Published by the Reef and Rainforest Research Centre on behalf of the Australian Government's National Environmental Research Program (NERP) Tropical Ecosystems (TE) Hub.

The Tropical Ecosystems Hub is part of the Australian Government's Commonwealth National Environmental Research Program. The NERP TE Hub is administered in North Queensland by the Reef and Rainforest Research Centre Limited (RRRC). The NERP Tropical Ecosystem Hub addresses issues of concern for the management, conservation and sustainable use of the World Heritage listed Great Barrier Reef (GBR) and its catchments, tropical rainforests including the Wet Tropics World Heritage Area (WTWHA), and the terrestrial and marine assets underpinning resilient communities in the Torres Strait, through the generation and transfer of world-class research and shared knowledge.

Cover photographs:Matt Curnock and the Great Barrier Reef Marine Park

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December 2013

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Acronyms Used In This Report

ABS	Australian Bureau of Statistics
CQU	Central Queensland University
CS	Consumer Surplus
CV	Contingent valuation
DEEDI	Department of Employment, Economic Development and Innovation
DERM	Department of Environment and Resource Management
DSEWPaC	Department of Sustainability, Environment, Water, Population and Community
ES	Ecosystem services
EMC	Environmental Management Charge
GBR	Great Barrier Reef
GBRCA	Great Barrier Reef Catchment Area
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
JCU	James Cook University
LS	Life satisfaction
LGA	Local Government Area
MEA	Millennium Ecosystem Assessment
NERP	National Environmental Research Program
NSW	New South Wales
PC	Payment card
QLD	Queensland
QPWS	Queensland Parks and Wildlife Services
QSIA	Queensland Seafood industry Association
RRRC	Reef and Rainforest Research Centre Limited
SD	Statistical Division
SP	Stated Preference
TEV	Total Economic Value
VIC	Victoria
WTP	Willingness to pay
WTWHA	Wet Tropics World Heritage Area

Acknowledgements

We would like to acknowledge the invaluable contribution of all those who contributed their time to this project – responding to emails, reading through and commenting on questionnaires, participating in workshops, and sharing their knowledge and expertise with us.

We also wish to extend our sincere appreciation to dozens of tourism operators who helped us distribute the questions and to the thousands of anonymous people who took the time and effort to complete our survey – without such input the project could not have gone ahead.

Executive Summary

Chapter 1: Background

This report is associated with the Tropical Ecosystems NERP Project 10-2: *Socioeocnomic systems and reef resilience.* The main aim of the project is to improve our understanding of the relationship between the socioeconomic system and the Great Barrier Reef World Heritage Area (GBRWHA), and it comprises three interrelated activities, the specific objectives of which are to improve our understanding of:

(a) resident views about the relative 'value' of key ecosystem services that are provided by the GBRWHA;
(b) tourist views about the relative 'value' of ecosystem services that are provided by the GBRWHA, and the likely consequence (e.g. fewer visits, less expenditure) of deterioration in some of those services; and
(c) the extent to which variations in beef prices and other socioeconomic variables (in conjunction with biophysical variables) influence water quality in the GBR lagoon.

Simplisitically, it is as if objectives A and B seek to learn more about what the GBRWHA does for people, whereas objective C seeks to learn more about what people do to the GBRWHA.

This report focuses exclusively on objectives A and B, providing a preliminary overview of the data collected to support those investigations – mainly in the form of descriptive statistics and bar charts. More sophisticated analysis of the data is necessary (given the existence of many confounding and interacting factors), is currently underway and will be reported on separately in future publications.

Chapter 2: Prepatory activities (literature review and workshops)

There are different frameworks for thinking about the way in which the environment benefits people, all highlighting the fact that:

a) the GBRWHA has value far above and beyond that which is reflected in the marketplace;
b) there are likely to be many different ways in which people relate to, interact with and benefit from the GBRWHA – i.e. there are many different types of environmental 'values'.

If interested in 'values' associated with the GBRWHA, it is thus important to begin the process by identifying a set of regionally relevant values for assessment. So we consulted the literature and conducted workshops with a variety key stakeholders (in Cairns, Brisbane and Townsville) to identify a set of regionally relevant 'values'.

Moreover, there are many different types of valuation techniques, each of which generates a different type of information, and none of which are suited to all contexts. It is thus important to learn more about the managerial context before selecting a valuation technique – so our literature review and stakeholder workshops also sought to learn more about those issues .

People were interested in a broad range of different 'values' – not just those about which we have most information (i.e. those associated with the tourism industry). Some people simply wanted to be able to use our research results to raise public awareness of the importance of the GRWHA; others thought it would be good to use our results to help them assess the way in which key 'values' might be impacted by particular management changes (e.g. further reductions in water quality). So we decided to develop a questionnaire that would allow us to use

a) a variation of the life-satisfaction approach to assess

i. the 'value' of a wide variety of ecosystem services (benchmarked against some market goods and services);
ii. the effect that changes in those ecosystem services would have on overall quality of life (benchmarked against market changes).

b) the contingent valuation approach to assess marginal changes for three of the key issues identified in (a ii)
c) visitor expenditures and to assess some types of tourism values.

Chapter 3: Questionnaires

Core sections of our resident questionnaire thus included questions about

- The socio-demographic background of respondents (age, income, etc)
- How often residents go to the GBRWHA, and what they do while there
- The importance of various 'goods and services' provided by the GBRWHA to overall quality of life and satisfaction with those goods and services.
- Satisfaction with life overall
- People's perceptions about the way in which their overall quality of life would be affected by changes in various environmental and market factors (e.g. higher prices, reduced water clarity).
- Willingness to pay (WTP) for improvements in various environmental attributes in the GBRWHA.

When developing the tourist questionnaire, we sought to keep questions similar (to enable comparisons) but altered the wording of some segments. As such, core segments of this questionnaire included questions about:

- The socio-demographic background of respondents PLUS background about travel party and origin
- How often visitors had been to the GBRWHA in the past and what they did (or planned to do) while on this particular trip
- Questions about the importance of various 'goods and services' to their overall decision to come to the region (in contrast to the resident survey which asked about importance to overall quality of life).
- Their satisfaction with the trip overall (in contrast to the resident survey which asked about satisfaction with life overall)
- The way in which their decision to come to the region would have been affected by changes in various environmental and market factors (in contrast to the resident survey which asked about the way these things would affect overall quality of life).
- Expenditure while in the area
- Willingness to pay for improvements in various environmental attributes

Importantly, we randomized the order of items presented to respondents for assessment, and we translated the tourism questionnaires into both Chinese and Japanese.

Chapter 4: Data collection/sampling

We sought permission from various airports, ferry/boat operators, caravan-park owners and local governments in Cairns, Port Douglas, Townsville, Bowen, Airlie Beach, Rockhampton and Yeppoon to collect data from visitors at those locations. We visited those locations at various times throughout a 12 month period, using Mandarin and Japanese speaking assistants when distributing questionnaires to Chinese and Japanese visitors. We also

enlisted the help of a stratified random selection of tourism operators between Cooktown and Gladstone – to distribute questionnaires to their customers. In total we collected 2743 tourist questionnaires – 225 from Chinese speaking visitors and 243 from Japanese speaking visitors.

We identified postcodes that lay either partially or entirely within the GBR catchment area, sending an even number of questionnaires to each. We estimate that 3977 reached their intended recipient and we received 902 completed questionnaires, giving an overall response rate of 22.7%. We sought to reduce problems with non-response bias to postal surveys by ensuring that when research assistants visited airports, lagoons (etc) to intercept tourists, they also had residential questionnaires, so that we could take advantage of incidental intercepts. We also engaged an Indigenous researcher to help collect data from within Indigenous communities. These extra activities gave us an additional 663 responses, so in total we received 1592 completed residential surveys.

Chapter 4: Summary of responses to key questions

Background on both residents and tourists

In total, 50.3% and 54.9% of residential and tourist respondents, respectively, were female. Approximately 6.6% of residential respondents self-identified as either Aboriginal or Torres Strait islander or both; the figure was higher for tourists (13.5%). More than half of the tourists (53%) who answered the survey were between 20-40 years old while 44% of residents are aged between 40-60 years. Almost 47% of residents and 18% of tourists considered themselves to be recreational fishers; 31% of residents and 52% of tourists had completed a university degree. More than one-quarter of both residents and tourists noted that the Government / Health / Education sector was their main source of income. Mining, Agriculture and, to a lesser extent tourism, were much more important sectors (in terms of income dependency) for residents than they were for tourists. An overwhelming 74% of residents and 78% of tourists revealed they do not contribute to or volunteer for any conservation organizations. The inland region had a lower proportion of respondents who self-identified as recreational fishers than those living closer to the coast.

Most residents (85%) had been to the GBRWHA at least once in their lives. The majority (40%) had spent about a day on their most recent trip; 18% had spent 2-3 nights on their most recent trip, and nearly 22% had spent 4 nights or more. The majority of resident respondents indicated that they were either very satisfied (43%) or satisfied (44%) with their life overall; only 5% said that they were unsatisfied or very unsatisfied. There was, however, considerable variation cross space with some regions recording much lower mean life-satisfaction scores than other areas.

More than one half of all tourists (57%) said that this was their first visit to this region. The median number of nights spent along the coast near the GBRWHA was 5. More than one-third of tourists (36.24%) were travelling as a couple; almost 20% were travelling with friends. Almost 55% of tourists were international visitors. The majority of international visitors (659 out of 1506) come from Europe. Most domestic visitors were from Queensland (41%); 24% were from NSW and 22% from VIC. The majority of tourists were either very satisfied or satisfied with overall experience in the GBRWHA: the most satisfied tourists were from Japan (91%) and Europe (89%).

The average amount of money each tourist spent while in the region was $1129.5 (mean) and $604 (median). Most money was spent on accommodation ($451.8 per person for the entire stay), at cafes, bars or restaurants ($217.5) and on groceries $203.8.

Most frequent activities

Going to the beach was the most popular activity of both residents and tourists, fishing and boating were the next most popular activities of residents. In contrast, fishing was not

popular with tourists; instead going to the islands and off-shore reefs (for snorkelling) were the most popular activity after beach visits. International visitors were much more likely to participate in a large number of different GBRWHA-based activities than were visitors from other parts of Australia, and from Queensland. Just over 20% of the residents who responded to our sample had not done any activity at all in the GBRWHA during the last 12 months, although the majority (65%) had been involved in more than one activity. Respondents who did not provide a postcode, or who were fly-in/fly-out (pseudo) residents had lower overall activity levels within the GBRWHA than other residents.

Most important environmental 'values'

Residents felt that having healthy coral reefs and reef fish, no visible rubbish, iconic marine species, clear ocean water, healthy mangroves and wetlands, were more important to their overall quality of life than the jobs and incomes related to the mining and agricultural, commercial or tourism industries. The 'average' resident was somewhat dissatisfied with the benefits they received from cheap shipping, and from the mining, agriculture and commercial fishing industries. Similar to residents, the items that tourists rated as being the most important factors when considering whether or not to come to the region were those relating to the environment – e.g. clarity of water, healthy coral reefs, healthy reef fish and lack of rubbish. These were generally more important than market-based factors (e.g. availability of good quality of accommodation, prices that match budget - here termed 'local prices'). Fishing was relatively unimportant for tourists (reflecting activity data). Satisfaction scores were generally less than importance scores – although the gap between importance and satisfaction was less marked for tourist than for residents.

Reactions to scenarios that degrade the environment

Both residents and tourists were asked to tell us how they would respond to a series of eight hypothetical 'changes': residents were asked to tell us how the change would affect their overall quality of life, tourists were asked how the change would have affected their overall decision to visit the region. Responses reinforce earlier messages: environmental factors are important to overall quality of life, and some types of environmental degradation would have a stronger adverse impact on overall quality of life than a 20% increase in prices (compared to elsewhere in Australia). Similarly for tourists: it seems that the worst thing that could happen is having twice as many oil spills or ship groundings. The next biggest "turn off" would be the ocean water changing from clear to murky or having twice as much rubbish on the beaches and islands. People did not seem to be all that bothered by the prospect of having less chance of catching fish.

Willingness to pay to help improve the environment

Despite the fact that so many residents indicated that various environmental goods and services were important to their overall quality of life, nearly 45% of resident respondents said that they were not willing to contribute any money at all to 'funds' set up to: improve water quality, protect top predators, or reduce the risk of oil spills and ship groundings. A larger percentage of tourists were willing to make such a contribution. The average amount which residents were WTP per annum was nearly twice that of the amount tourists were WTP per trip. Both residents and tourists were willing to pay most for water quality improvements

Attitudes towards preservation of the GBRWHA

Although most people (residents and tourists) disagreed with the statement "only people who live near or visit the GBRWHA have a responsibility to care for it" most agreed with the statement that "I am not prepared to pay unless people throughout Australia pay too".

1 Introduction

1.1 Project aims and objectives

This report is associated with the Tropical Ecosystems NERP Project 10-2: *Socioeocnomic systems and reef resilience.* The main aim of the project is to improve our understanding of the relationship between the socioeconomic system and the Great Barrier Reef World Heritage Area (GBRWHA) – the borders of which are shown by the red line in Figure 1.

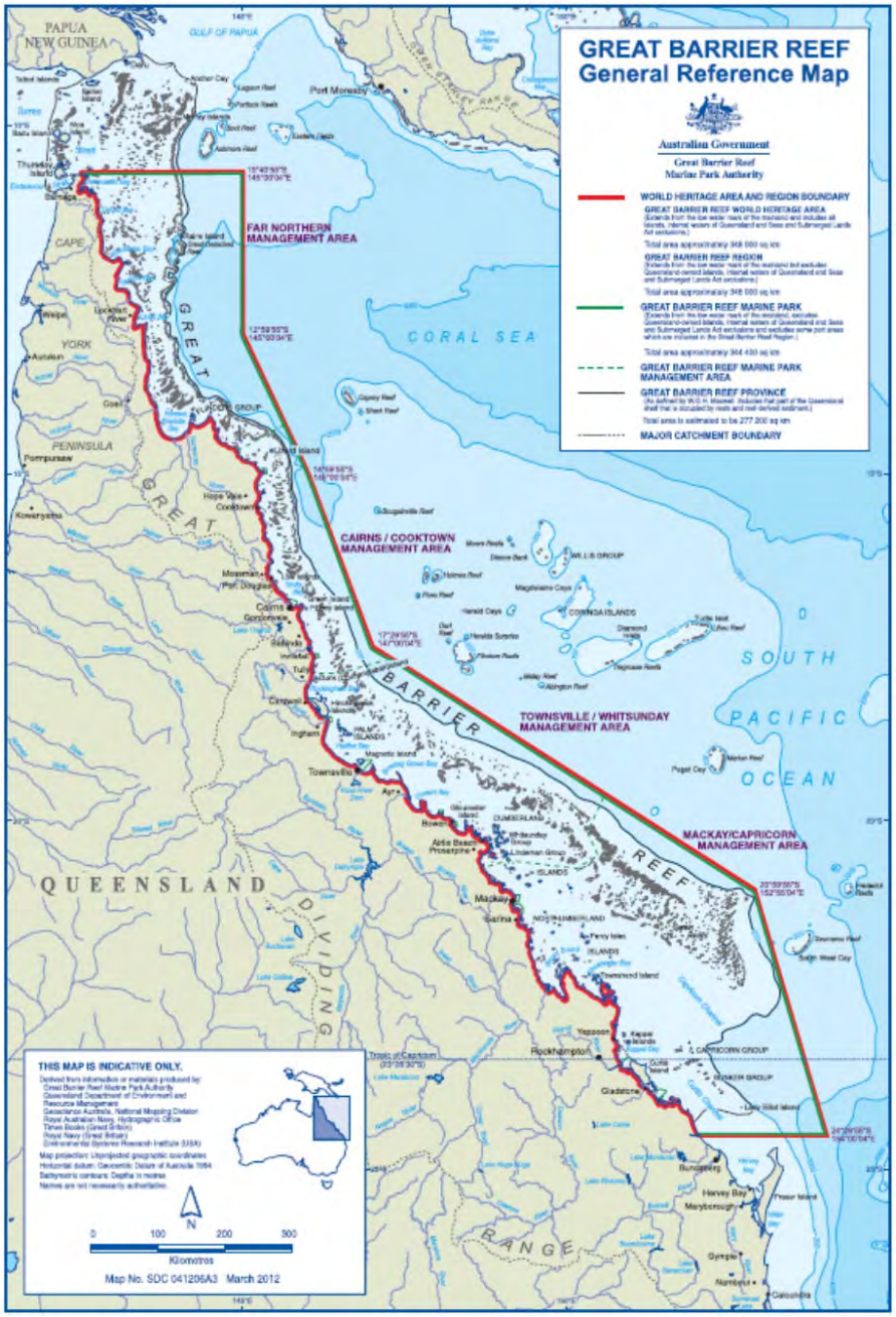

Figure 1: Management areas in the GBR
(Source: GBRMPA, 2012)

The conceptual model underlying the project (adapted from Common and Stagl (2005), p 87) is shown in Figure 2 below. It hypothesises that (a) there are multiple economic systems which are embedded within social systems, which are, themselves, embedded within the broader environment; and that (b) there are multiple ways in which these sub-systems interact. Just as people living in one part of the world exchange goods and services with people living in other parts of the world, so too do they exchange goods and services with the broader, biophysical environment. For example, people (socio-economic systems) use the environment as a waste receptacle (almost analogous to a country exporting goods to other parts of the world) but they also benefit from being able to use many of the biophysical system's resources for recreation, food and aesthetics. This project focuses on some of those interactions, learning more about the 'value' which people place upon the goods and services provided to them by the GBRWHA (i.e. about what the environment does for people), and about the way in which people's activities affect that environment.

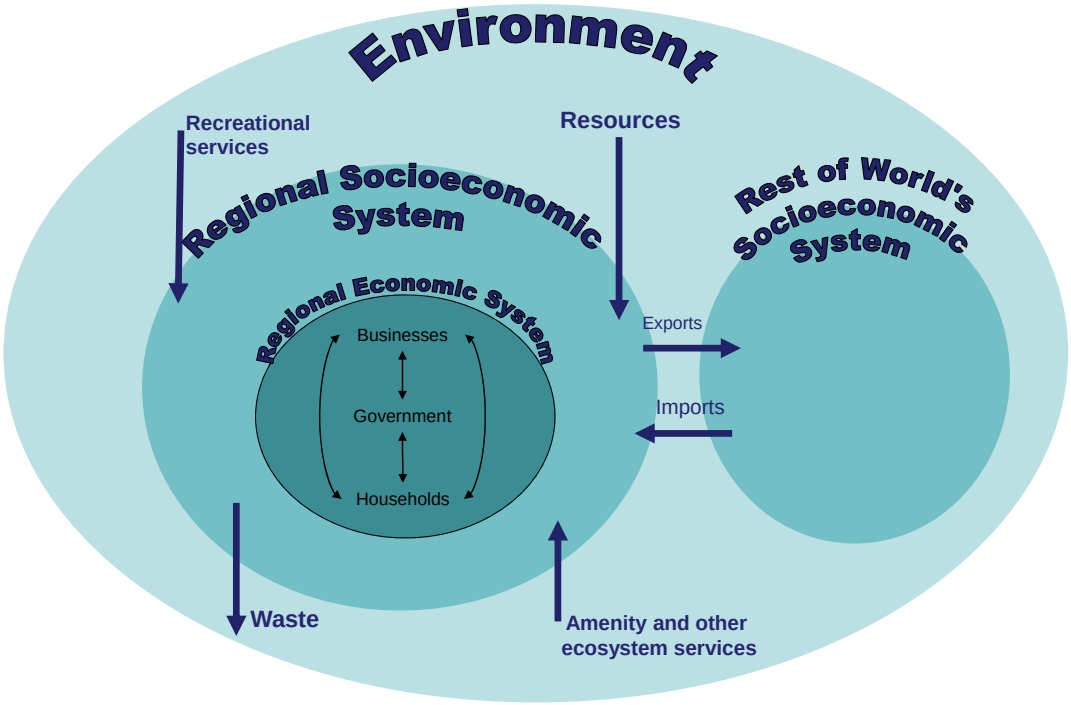

Figure 2: Conceptual model underpinning the investigations of Project 10.2

The project comprises three interrelated activities, the specific objectives of which are to improve our understanding of:

(d) resident views about the relative 'value' of key ecosystem services that are provided by the GBRWHA;
(e) tourist views about the relative 'value' of ecosystem services that are provided by the GBRWHA, and the likely consequence (e.g. fewer visits, less expenditure) of deterioration in some of those services; and
(f) the extent to which variations in beef prices and other socioeconomic variables (in conjunction with biophysical variables) influence water quality in the GBR lagoon.

Simplisitically, it is as if objectives A and B seek to learn more about what the GBRWHA does for people, whereas objective C seeks to learn more about what people do to the GBRWHA.

1.2 Report aims and structure

This report focuses exclusively on activities A and B, providing a preliminary overview of some of the data collected to support those investigations[1] – mainly in the form of descriptive statistics and bar charts. More sophisticated analysis of the data is necessary (given the existence of many confounding and interacting factors), is currently underway and will be reported on separately.

The structure of this interim report (provided in Figure 3) follows our methodological approach. Specifically, we spent almost a year in 'preparation' (section 2) – persuing the literature and consulting with stakeholders (individually and in workshops), so as to identify management challenges, knowledge gaps, 'values' to be assessed, and appropriate assessment tools (suited to those values and management challenges). We then spent much time devising, testing and designing an appropriate survey instrument (section 3), devising an appropriate sampling strategy and collecting data (section 4). Section 5 contains a collection of tables, charts and figures (organized under various themes) that summarise data collected in that process.

The appendices provide supporting materials (e.g. copies of questionnaires).

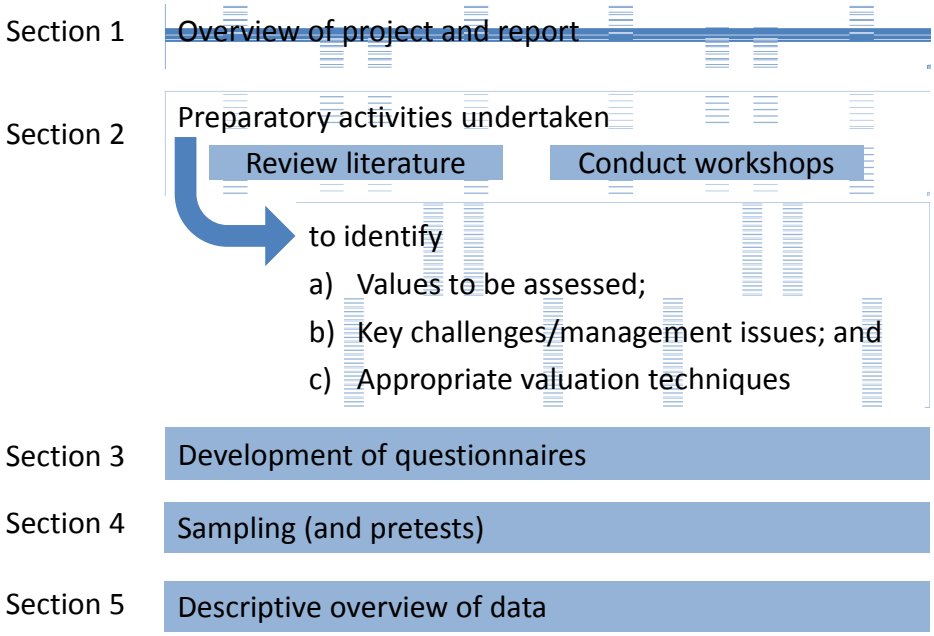

Figure 3: Report Structure

[11] We have also been collecting data from tourists each month at the Cairns airport as part of a long-term monitoring program set up by Bruce Prideaux under the MTSRF program, and continued here. A report summarising those activities is available separately.

2 Preparatory activities undertaken

2.1 Review of literature

2.1.1 Frameworks for considering a range of different 'values'

Shortly after the turn of the century a group of (mainly biophysical) scientists working on a project entitled the Millennium Ecosystem Assessment (MEA) sought to highlight the fact that the environment is 'of value' for a variety of reasons – not simply because it can be used to 'produce' food and shelter for humans. Specifically, the MEA noted that humans are the recipients of a variety of different ecosystem services (ES) – categorised as *provisioning, regulating, cultural and supportive services* – which contribute to a variety of different constituents of human and social wellbeing, such as *security, health, social relations, food and freedom of choice and action* (Millennium Ecosystem Assessment (MEA), 2005) – see Figure 1.

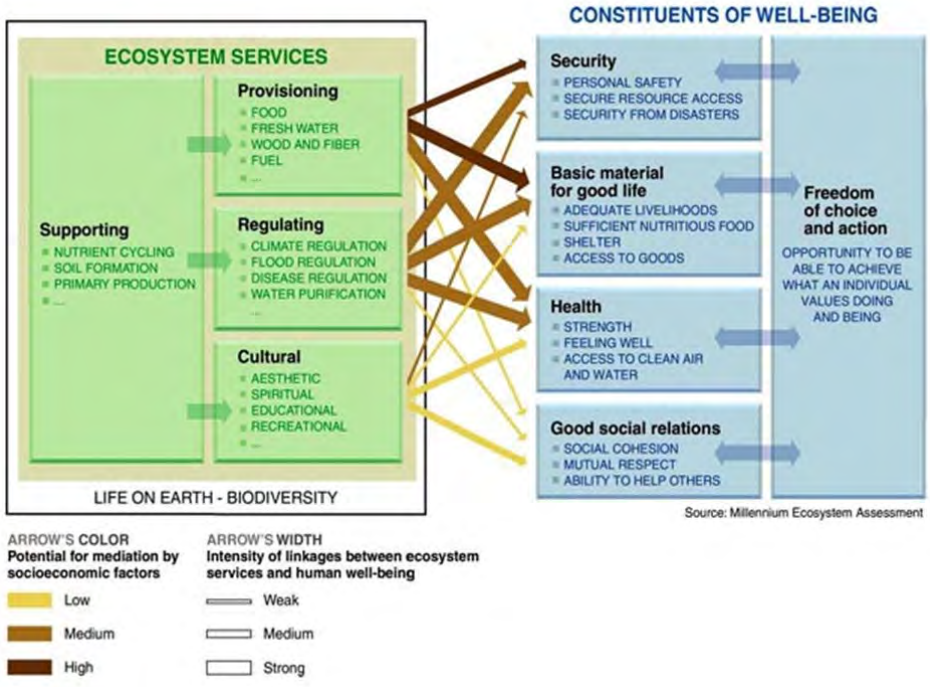

Figure 4: Relationship between ecosystem services and constituents of well-being
(Source: MEA, 2003)

Yet the idea that value of the environment extends beyond price is not new to this century; neither is it new to social scientists. The economists Dupuit in 1861, and later Marshall in 1881, noted that market price is not synonymous with value (introducing the concept of *consumer surplus*), and economists have long been called upon (for good or for evil) to generate monetary estimates of the value of the environment – i.e. they are frequently asked to conduct *valuation* exercises (discussed in more detail in section 2.1.2). In an attempt to make this valuation task easier, economists sometimes work with what is called the Total Economic Value (TEV) framework which identifies different categories of value such as: 'direct use value'; 'indirect use value', 'option values', 'bequest' and 'existence' value (after Weisbrod in the 1960s and Kurtilla in 1967).

On the surface, the MEA and TEV frameworks appear quite different, but both frameworks include similar concepts and thus have much in common. Figure 5 attempts to highlight

some of those similarities. For example, in the MEA food from aquatic resources would be classified as a 'provisioning service' (provisioning services are marked with a dark blue arrow in Figure 5); whilst in the TEV framework food from aquatic resources would be included in 'fisheries' and thus classified as a 'direct use value'. Similarly the MEA's 'regulating' values (light blue diamond in Figure 5) are most often considered as 'indirect use' values in the TEV framework; while MEA's 'cultural' values correspond to a range of use and non-use values of the TEV.

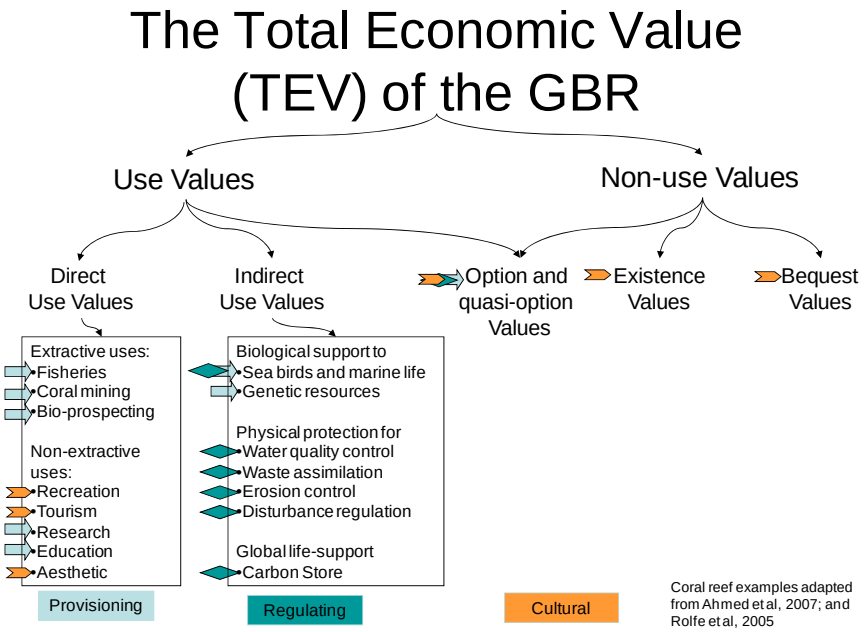

Figure 5: Comparison of Total Economic Value (TEV) and Millennium Ecosystem Assessment (MEA) Ecosystem Services frameworks, with some examples relevant to the GBR

In short, both frameworks use quite different terms, but they are similar in that they highlight the fact that:

c) the environment has value far above and beyond that which is reflected in the marketplace;
d) there are many different ways in which people relate to, interact with and benefit from the environment – i.e. there are many different environmental 'values'.

The key point to be made here therefore, is that if interested in 'values' associated with the GBR, it is important to begin the process by identifying a set of regionally relevant values for assessment. We did this in two ways: by consulting the literature to identify significant research gaps (discussed in more detail in section 2.1.2); and by conducting workshops with a variety key stakeholders to focus thought on 'values' most significant to them (discussed in more detail in section 2.2).

2.1.2 Issues to consider when selecting a non-market valuation 'technique'

Over the years, economists have developed many different valuation techniques – depicted in Figure 6 – to quantify the benefits (or costs) of different types of environmental goods and

services. Indeed, there is a vast body of literature on different techniques for attempting to derive relevant monetary estimates and interested readers are directed to Getzner *et al.* (2005), Bateman *et al.* (2002), Rietbergen-McCracken & Abaza (2000), Garrod & Willis (1999), and Willis *et al.* (1999) for detailed reviews.

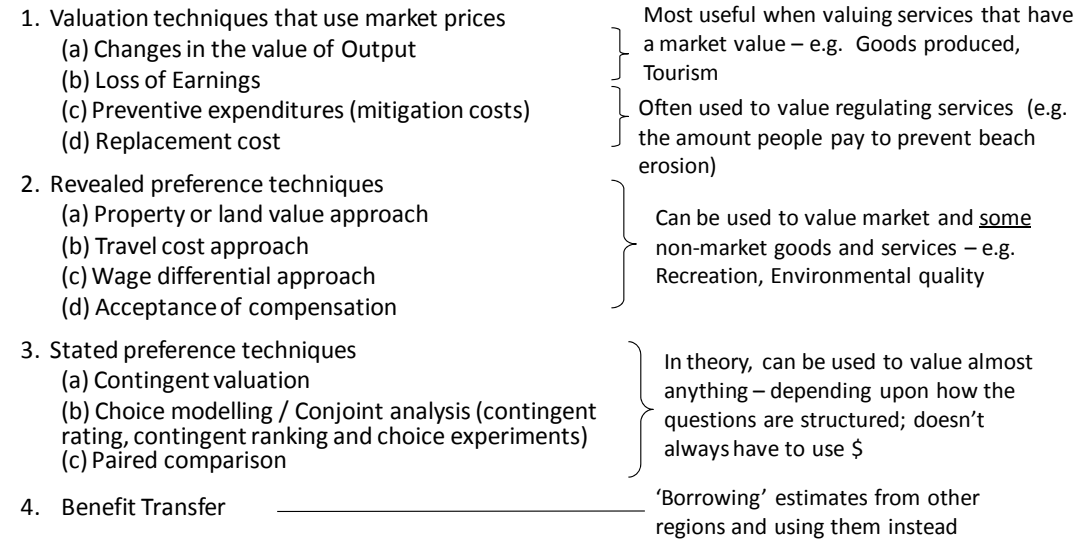

Figure 6: A range of Valuation Techniques
Adapted from Gregersen *et al.* (1987), Driml (1994) and Grey (1996)

Although sometimes considered to be more 'reliable' than other approaches (primarily because they use objectively verifiable data), valuation techniques that use market prices are not able to provide information about the value of goods or services if they are not exchanged on the market. As such they cannot be used to estimate the financial 'worth' of things like cultural, existence or bequest values. Revealed preference techniques do not require there to be a market for the good being studied (e.g. a view) but they do require a strong association between the market that is being studied (e.g. housing, and thus house prices) and the environmental factor of interest (e.g. views of a river). If that association cannot be established, revealed preference techniques cannot be used. In other words, if there is no link whatsoever between the environment and existing markets, then stated preference (SP) techniques such as choice experiments and contingent valuation studies are the only way to generatie a financial estimate of the 'value' of such goods or services. SP techniques do not require the existence of a market and are (in theory at least) able to generate estimates of either the marginal or the total value of anything.

The key point to be made here, therefore, is that one needs to carefully identify which value(s) one wishes to assess (see section 2.1.2 and 2.2) before selecting a valuation method.

But that is not the only consideration. As clearly highlighted by Pagiola's (2004) summary of popular valuation techniques, none of the methodologies (or 'valuation' techniques) are flawless: most are surrounded with at least some controversy vis-à-vis the 'accuracy' of final estimates; each requires different types of information as an input; and each produces (sometimes subtly) different information as output. To explain, note that some of the valuation techniques listed in Figure 6 generate estimates of *Prices* – represented by the dark blue line in Figure 7. In contrast, some techniques generate estimates of *Expenditure* – shown as the blue rectangle in Figure 7 – whilst other techniques generate estimates of:

- Consumer surplus - CS (the amount that a consumer would be prepared to pay for a good, over-and-above what is actually paid) – shown as the purple triangle in Figure 7;
- Total WTP = expenditure plus CS (i.e. the blue rectangle plus the purple triangle);
- CHANGES in expenditures – the dark red rectangle in Figure 7; and/or
- CHANGES in CS – the yellow trapezoid in Figure 7.

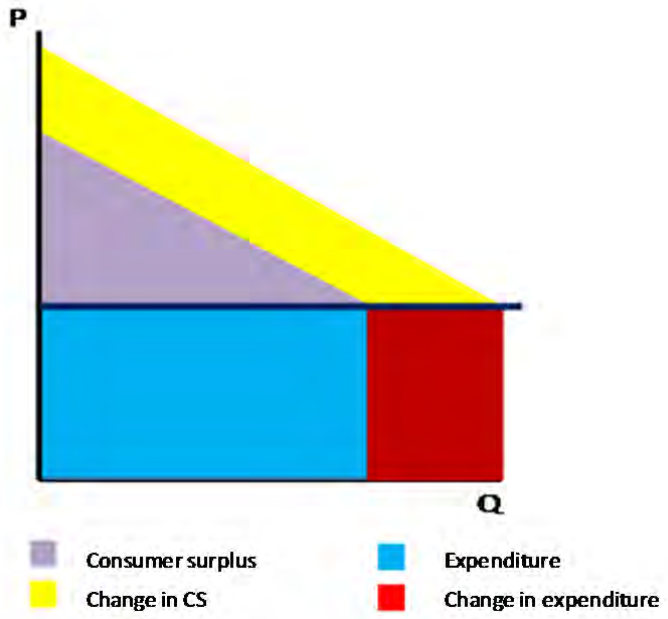

Figure 7: Stylised representation of the different types of estimates (e.g. price, CS, expenditure) that are generated by different valuation techniques.

In other words, even though most valuation techniques generate estimates of 'value' that are denominated in dollars, these dollar estimates cannot always be validly compared. Simplisitically, one may end up comparing triangles, rectangles and lines (a bit like comparing apples, oranges or even space ships). Moreover, one may not be able to add values that have been generated from different studies – even if they have used the same valuation technique – unless numerous conditions hold[2].

Arguably, one of the more significant problems is that many of the 'values' identified in the MEA and the TEV frameworks overlap, so adding components to generate an estimate of TEV is akin to adding sets in a simple Venn-diagram like that below: TEV will not equal the value of A plus the value of B if these values overlap (See Hoehn and Randall, 1989 for a formal treatment of the problem).

[2] Formally, this approach will only be valid if
- the marginal utility of income is constant across all individuals, meaning that social values can be estimated by simply adding individual values (Adler and Posner, 1999);
- substitution effects and budget constraints are properly accounted for (Hoehn and Randall, 1989);
- general equilibrium effects are either minimal or are controlled for when estimating V_i^j (Carbone and Smith, 2013); and
- all components, j, contribute to the utility of each individual, i, in an additively separable manner , so that total values can be estimated by adding the value of components without risk of double counting (El Serafy, 1998).

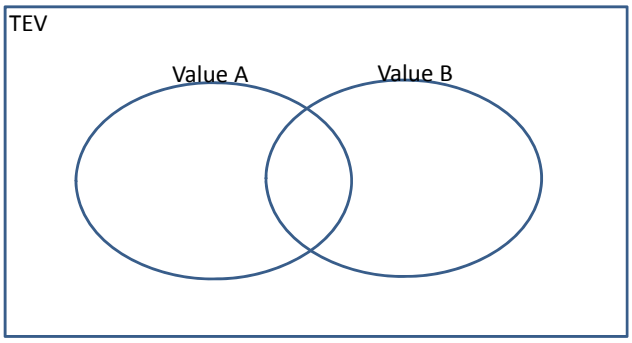

Figure 8: The 'venn' diagram problem facing those interested in estimating TEV

Another important consideration when selecting valuation techniques is that the different types of 'estimates' highlighted in Figure 7 also provide different types of information for manager/policy makers. To explain, note that valuation techniques which generate a monetary estimate of the 'total economic value' of a region, good or service (equivalent to the blue rectangle and the purple triangle combined in Figure 7) are particularly useful if seeking to:

- Describe the current state of affairs – for example, determining that one good or service is of more 'value' than another; or if
- Address 'all-or-nothing' management/policy questions such as: what losses would the region suffer if the entire GBRWHA ceased to exist?

But managers are not always faced with all or nothing choices (reef or no reef). Rather, they often need to make choices 'at the margin', and may, for example, need information that helps answer questions such as:

- What losses would the region suffer if development eroded (rather than erased) some of the region's values (e.g. if new enterprises affected aesthetic or biodiversity values)?
- What compensation should be sought (monetary or otherwise) if development 'x' takes place?

As such managers may not always be interested in the total value of a good or service; they may be more interested in trying to determine how the total value of a good or service might change in response to some external factor or pressure. In essence, their focus may be on the red and yellow shapes in Figure 7.

The key point to be made here, therefore, is that if one fails to ask what people need 'valuation' information for (i.e. the managerial/policy context) then one may select a valuation technique that is incapable of producing the type of information required by current decision makers. In this project we thus sought to better understand the context by interacting with, and conducting workshops with a variety key stakeholders/managers/decision makers to learn more about the issues confronting them (discussed in more detail in section 2.2), before selecting a valuation method.

Finally, it is important to note that many valuation techniques aim to determine the amount that individuals are willing to pay (WTP) to get more of an environmental good or service (or to determine how much they are WTP to avoid losing an environmental good or service). Although many people object to the idea of being asked to put a 'price' on what they may view as 'priceless', at an individual level, the concept is not all that unrealistic: *ceteris paribus,* an individual is likely to be WTP more for something that is important to them than

for something that is not. As such, the amount which someone is WTP for a particular good or service is likely to at least partially reflect their tastes, preferences or values.

But a problem arises when individual preferences (expressed in terms of WTP) are aggregated to draw inferences about social preferences. This is because WTP is also a reflection of income or wealth. All else constant, a rich person will be ABLE (and thus WILLING) to pay more for the goods and services which they enjoy than the poor[3]. So if one (a) attempts to measure preferences at an individual level by asking about WTP, and then (b) adds those 'preferences' across multiple individuals (each with a different income), one will create what is – in essence – a weighted index of value. And weights will be a function of income. In other words, 'traditional' (dollar-based) valuation techniques give greater voice to the preferences of the wealthy than the preferences of the poor unless deliberate attempts are made to redress that issue[4].

Fortunately, there are also non-monetary methods for generating quantitative assessments of the relative importance of a range of different 'values' – some of which have been successfully trialled in and around Northern Australia (See: Larson, 2009; Delisle, 2009; Stoeckl *et al.*, 2012 and Larson *et al.*, 2013 for published examples). Moreover, there is a growing body of literature on subjective wellbeing and overall life satisfaction (LS) which provides yet another way of looking at the 'value' of the environment – a good review of which can be found in Kristoffersen (2010). Simplistically, it is as if these researchers collect data on LS and then regress these measures against a range of other variables (including measures of both income and environment). The coefficients are then used to estimate the marginal contribution of the environment to LS; one can even look at the ratio of the coefficient on income to the coefficient on the environment to generate dollar denominated estimates of the trade-off between income and environment. That said, although these non-monetary approaches offer several advantages over 'traditional' dollar-denominated valuation approaches – they do not get around the Venn-diagram problem noted above; as such researchers need to use them with care.

2.1.3 Non-market valuation studies in and around the GBR

Our literature review (much of which is summarised in Figure 9) revealed that until recently, most GBR valuation studies have concentrated on a narrow range of ES (e.g. tourism and fishing) – although more recently, John Rolfe, from Central Queensland Univeristy has published several papers from choice modeling experiments designed to improve our knowledge of some of the non-use values associated with the GBR. Despite these recent publications, significant knowledge gaps exist – the most evident being an absence of information about the importance of different 'values' relative to each other[5]. Indeed, to the best of our knowledge, no previous study has investigated a full range of different 'values', or ecosystem services associated with the GBR (e.g. recreation AND production AND bequest), using the same methodological approach so that 'values' could be validly compared. If managers are required to make decisions about potentially competing values

[3] Not surprisingly, researchers often find that there is a strong relationship between WTP and income (see, for example, Jacobsen and Hanley, 2009).

[4] If there is no predictable relationship between incomes and preferences, then (in aggregate) this may not be a problem – differences in final estimates that have been generated from these dollar-based techniques are likely to reflect differences in values. But if there are systematic differences between the values, beliefs, and norms of the 'rich' and the 'poor' (e.g. if the 'average' person on a low income has different preferences to the 'average' person on a high income), then dollar-based techniques may generate final estimates of 'value' which do a better job of describing differences in income then they do differences in norms or preferences.

[5] As noted in the preceeding section, different valuation methods generate different types of information (the triangle, line, and rectangle problem), so it is not always valid to compare a 'value' generated in one study with a 'value' generated in another.

(e.g. fishing versus tourism versus aesthetic/cultural values), then the lack of comparable information about these different values may stand as a significant knowledge gap.

Services		Background and/or biophysical studies	Economic/valuation studies		
Cultural services	Australian icon	Great Barrier Reef Marine Park Authority[93]			Windle & Rolfe[34] investigated a subset of nonuse values, Alam *et al.*,[45] Oxford Economics[44]
	Cultural heritage	Smith[94]			
	Cognitive/ Scientific research	Lucas *et al.*,[1] Wachenfeld *et al.*[95]			
	Aesthetic	Lucas *et al.*[1]			
	Recreation	Great Barrier Reef Marine Park Authority[10]	Hundloe *et al.*,[30] Knapman & Stoeckl,[31] Carr & Mendelsohn,[33] Kragt *et al.*,[38] Prayaga *et al.*[41]	Driml,[22,24,111] Access Economics,[25,26] PDP Australia,[29] KPMG[23]	
Provisioning services	Fishing	Great Barrier Reef Marine Park Authority,[10] ABARE,[21] Queensland Department of Primary Industries and Fisheries[47]	Fenton & Marshall,[27] ABARE,[21] Grafton *et al.* *(ongoing research)*, Delisle[40]		
	Ports and shipping	Great Barrier Reef Marine Park Authority,[96] Australian Maritime Safety Authority,[97] Australian Government Department of the Environment, Water, Heritage, and the Arts (p. 103)[82]			
	Aquarium and ornamental trade (e.g., for fish, shells, and live rock)	Harriott[28]			
	Oil reserves, medicinal products	Ettinger-Epstein *et al.*[98]			
Regulating services	Protection from storms and tsunamis	Young and Hardy,[99] Knott,[85] Fabricius *et al.*,[51] UNEP-WCMC,[86] Massel *et al.*[52]			
	Water purification	McKergow *et al.*,[55] Lotze *et al.*,[100] Verhoeven *et al.*[101]			
	Climate regulation/carbon sequestration	Nellemann *et al.*[102]			
Supporting services	Nutrient cycling/ food webs	Chisholm,[66] Hughes *et al.*,[72] Hoey & Bellwood,[103] Gattuso *et al.*,[65] Graham *et al.*,[69] Sandin *et al.*,[104] Hixon & Jones,[70] Johnson *et al.*,[67] Bellwood & Fulton[71]			
	Habitat provision	Wilson *et al.*,[74] Halford *et al.*,[75] Emslie *et al.*,[105] Graham *et al.*,[69] Sheaves[76]	Watson *et al.*[32]		
	Coastal protection	Sheppard *et al.*,[106,a] Burke *et al.*[107,b]			
	Ecosystem health (resilience)	Nyström *et al.*,[81] Bellwood *et al.*,[68] Bruno *et al.*,[77] Harvell *et al.*,[78] Ainsworth & Hoegh-Guldberg,[79] Jones *et al.*,[80] Hughes *et al.*,[72] Wilson *et al.*,[74] Hernaman *et al.*[108]			

Figure 9: Significant gaps in understanding of 'values' associated with the GBRWHA
(Source: Stoeckl *et al.*, 2011)

2.2 First round of workshops

2.2.1 General background

Most evident from the discussion in section 2.1.1 is that there are multiple values associated with large and complex ecosystems such as the GBR and that our understanding of those values is limited (mostly to an understanding of recreational and fishing values). Recognising that it would not be possible to fill all research gaps, we thus set out to narrow the focus to ensure efforts concentrate on regionally relevant 'values'. This defined the first aim of our preparatory workshops.

Our background review literature (section 2.1.2) also revealed that there are many different types of valuation techniques, each of which generates a different type of information that cannot always be added or compared, and none of which are suited to all contexts. It highlighted the fact that when selecting valuation techniques, it is imperative that researchers are cognizant of the issues confronting policy makers, and the associated information requirements. This issue thus defined the second aim of our preparatory stakeholder workshops, namely to learn more about the management context so that we could ensure that our research focused on key issues (or values) of importance, and that it also generated the right 'type' of information about those issues (e.g. information about marginal and/or total values).

2.2.2 Logistical details

The first workshop was held in Townsville on 8 September 2011 with representatives from the Great Barrier Reef Marine Park Authority (GBRMPA) and project team members from the (other NERP social science project) to gain a 'management' perspective. Nine representatives from GBRMPA and three NERP 10.1 project team members attended. Given the significant synergies between the two projects, it was important to involve members of that project also.

The second workshop was held in Brisbane on 10 October 2011 and was attended by 14 managers, researchers and industry representatives related to fishing, including DEEDI, DERM, GBRMPA, Sunfish (recreational sector), QLD Seafood industry Association (QSIA), and JCU, to gain a 'fisheries' and state government perspective. (Attendees: Lew Williams, Randal Owens, Tony Ham, Bill Sawynok, Kirrily McInnes, Eric Perez, Jim Higgs, David Barnes,Steve Sutta, Michelle Winning, John Bennett, Judith Lynne, Joshua Maroske)

The third workshop was held in Cairns on 14 October 2011, and was attended by 5 tourism operators, as well as representatives from the Cairns airport, tour and accommodation booking operators, Port Douglas Tourism Board and Tourism Tropical North Queensland (thus providing researchers with a 'tourism' perspective). In addition, four JCU researchers with expertise in tourism related research also participated in this workshop (Attendees: Michelle Mayhew, Alan Wallish, Michelle Thompson, Christina James, Diane Jarvis, Taha Chaiechi, Doug Ryan, Natalie Gomez)

At the beginning of each workshop, researchers gave background information about the project and described the intent of the workshop. The geographic boundaries of the area to be considered were then discussed and in all three workshops it was agreed that the most suitable boundary was that of Great Barrier Reef World Heritage Area (GBRWHA). The GBRWHA closely aligns with the GBR Marine Park (GBRMP) extending more than 2300 km from the tip of Cape York in Queensland to south of the Tropic of Capricorn, almost to Bundaberg. Importantly, this area also includes islands coastal islands, beaches, estuaries, mangroves and other parts of the marine system: it is not limited to the reef.

In each workshop, the participants were divided into 3 separate groups, each one asked to record their perceptions of:

1. Attributes and ecosystem services provided by the GBRWHA that are of most value and of most importance to the region's residents.
2. Attributes of reef health, including ecosystem services, provided by the GBRWHA that are most valued and of greatest importance to visitors to the region.
3. Drivers of change and key management decisions for consideration.

Each group was given 40 minutes to work on their 'activity', participants were then rotated, so that all people had the opportunity to contribute to each 'activity'. One of the research team members served as a scribe for each activity, thus ensuring continuity.

When all activities were complete, a person from each table summarized key points from their activity, and the lists (of 'attributes', 'values' or key management issues) were placed on walls around the room. Each participant was then given 10 "votes" (stickers) to be allocated across the items which they thought were most important to assess. They could place all stickers on one item, they could distribute them across ten separate items, or some other pattern – it was entirely up to them. When workshops were finished, researchers compiled the lists, noting how many 'votes' each item received.

2.3 Findings from preparatory activities

2.3.1 Values to be assessed

Ideas collated during the three workshops are summarized in Table 1 (resident values) and Table 2 (tourist values). These tables list the values/issues identified by participants in the left hand column; the right hand column shows the number of stickers which participants placed against each type of value/issue. The values have been organized into general themes. The existence of iconic species, such as turtles and dugongs, and the existence of the reef itself ("knowing that reef is there") were given the highest number of 'votes', receiving 15 and 13, respectively. Non-consumptive recreational values (such as swimming, snorkeling and boating), were also highly ranked and received 12 votes. Interestingly, consumptive uses of the area were given relatively little attention, with recreational fishing receiving 6 votes and commercial fishing gaining only 3 votes.

For tourists, aesthetic values of the underwater environment, expressed as variety and colour of fish and reefs, received 32 votes. A number of factors that could potentially diminish those aesthetic values were also discussed, such as coral bleaching or algal blooms. The variety and range of different habitats making up the GBRWHA also received many votes (18). Water clarity and biodiversity values were highly ranked by participants, receiving 13 and 12 votes, respectively (Table 2). An interesting emerging theme was related to tourists' expectation and perceptions, indicating that the satisfaction with the experience will be relative to a person's expectations of what the reef is going to look like – this was an important theme which we subsequently explored in both the tourist and resident questionnaires (asking both about importance and about satisfaction).

Table 1: "Values" considered important to residents with 'priorities' given by workshop participants

Theme	Examples of actual wording	No of votes
Existence of iconic species	Species – Dugong / turtles Iconic species Pride in local icons – turtles, dugong, whales	15
Knowing the reef is there	Knowing it is there and that we have a right and ability to use GBR Just being there Knowing the reef is there	13
Non-consumptive variety of outdoor activities and opportunities to interact with nature [non-fishing]	Kayaking and other water activities Family day out Boating Diving Recreation: swimming, snorkelling Opportunities not offered in urban areas	12
Tourism related jobs	Tourism related jobs Attractant to tourists Cultural tourism	9
Reef protection and governance	Governance and institutions to help protect the reef Knowing that someone is managing and caring for the reef	8
Indigenous cultural values	Indigenous cultural values	8
Identity as a "fisher"	Identity, for both recreational and commercial fishing	8
General quality of life	Natural surrounds reduces materialism and focus on money / superficiality Stress relief / healthy lifestyle Friendly atmosphere / people	7
Recreational fishing	Recreational fishing Recreational fishing (not for food)	6
Sense of place / historical connection	Sense of place / historical connection	6
Brag-ability	(about variety of wildlife, biodiversity and living in the region)	5
Clarity of water	Clarity of water (both inshore and offshore)	4
Non-use – spiritual connection	Non-use – spiritual connection Emotional connection to nature	4
Visual aesthetics (of the region)	Cleanliness and pristine nature Beauty Lack of congestion	4
Importance of habitats	Seagrass beds: important for recreational fishing (food) Mangroves habitat: Filter and protector, trapping nutrients etc Reef protects waterways and beaches	4
Commercial fishing	Commercial fishing	3
Weather and climate	Weather and climate	2
Accessibility and supporting infrastructure	Supporting infrastructure e.g. boat ramps, marinas etc – how to go out and appreciate ES Islands close enough to coast and easily accessible	1
Diversity of species	Diversity of species	0
Availability of local fresh fish	Availability of local fresh fish (in shops and restaurants)	0

Table 2: "Values" considered important to tourists with 'priorities' given by workshop participants

Theme	Examples of actual wording	No of votes
Aesthetic value of underwater environment, coming from species variety and abundance	Variety of fish – type, amount, iconic species Many species, Lots of fish Variety , size and species mix Colour of fish and coral Right type of fish Coral structure Negative aspects discussed: - Injured animals and disease; - Algal bloom - Crown of Thorn starfish; - Coral Bleaching - Visibility of other industries eg gas, trawlers - Diseased / damaged coral	32
Habitat – changes, range / variety	Reefs Coral cays Freshwater wetlands Mangroves and estuaries Sea grass meadows Beaches	18
Water clarity	Water clarity Water quality – runoff & nutrients Negative aspects discussed: - Algal growth ; - Urban development	13
Biodiversity	Biodiversity (seen and unseen) Range of iconic species and endangered species Size and diversity of ecosystems and species mix	12
Expectations and perceptions	Expectations / perceptions (governed by where going and why) Marketing Communications	11
Untouched	Looks natural Peace and quiet – no sense of crowding, level of isolation, pristine Negative aspects discussed: - Level of development	10
Reef protection and governance	GBRMPA people to be visible at the marina (when tourist boats are going out) Regulations (to protect reef, wildlife and tourists)	8
Diversity of activities available	Diversity of experiences (which include both natural and man-made) Variety of activities (at any time) Seasonal variability (different things happened at different times)	6
Accessibility and supporting infrastructure	Accessibility to all demographics and mobility Access - physical, regulation Facilities / infrastructure ; Different ways to see the reef	6
Weather and climate	Cyclones and wind Flooding Weather	6
Catch-ability	Ability to catch fish – perceived abundance Catch-ability (guaranteed results) Target species (sporting / edible)	5
Visual aesthetics of a region as a whole	Region as a whole - beaches, blue sea, palm trees, forests, blue sky	4

Theme	Examples of actual wording	No of votes
	Negative aspects discussed: - Pollution - Rubbish - Visual pollution (solid waste) on the coastline - Level of development	
Ecological processes	Ecological processes Chemical / physical processes Ocean acidification	4
Quality of service by operators	Quality of service by operators - handling of tourist Education and knowledge of operators Info providers and conservation message Boat size and condition	4
Unique experience	Size of reef Brag-ability (bucket list, been there done that) Uniqueness – unique experience	3
Cost	Price Exchange rate	2
Seafood quality & variety	Seafood quality & variety	1
Safety	Safety of various aspects – boats, general safety on land	1
Adventure	Sense of adventure – new experiences, fun	0
Sharing local knowledge	Local knowledge, education	0

1.1.1 Key management challenges

Participants in the first two workshops concentrated on exploring the drivers of change for the region which may threaten values. By their own choice, participants in the third workshop chose to concentrate on potential management intervention points.

Potential drivers of future change perceived as of key importance to the region included the following (number of votes received indicated in brackets):

- Commodity boom and mining (11)
- Water quality (8)
- Coastal Development (key drivers differ spatially / regionally eg. Cairns vs Gladstone) (7)
- Infrastructure change
- Urban development
- Climate change (6)
- Management and regulation, management of change (6)
- Food production (5)
- Allocations and property rights (3)
- Loss of habitat (2)
- Over fishing (2)
- Population increase (1) / urbanisation, crowding (0)
- Australian $ (0)
- Government input costs (eg. carbon tax – effect on fuel) (0)

It is important to note that mining was also discussed under the “coastal development” theme, where the secondary effects of mining, such as those associated with port developments, change in demographics, crowding, and urban development etc, were in focus.

In the third workshop, potential management intervention points were discussed. These included the management of (with number of votes received indicated in brackets):

- Recovery from the disasters (oil, coral bleaching) (3)
- Interpretation: better education and awareness of staff (3)
- Quality of infrastructure (safety, vessel appearance, interpretation points etc,) (0) and moorings and pontoons (3)
- Training divers to include conservation (3)
- Protecting mangroves (2)
- Improving ways of communicating information (between GBRMPA and tourists and residents) (2)
- Destination management (2)
- Controlling congestion (1)
- Management of runoff (1) both urban and agricultural
- Increased scientific understanding of impacts of tourism (0)
- Management of safety e.g. jellyfish and crocodiles (0)
- Management of the reef image and value of science (0)
- Quality of management of the reef (0)

1.1.2 Post-workshop deliberations

All members of the project team held an in-house workshop (Oct 17-22, 2012 inclusive) to blend insights from the literature and workshops, to identify appropriate valuation 'strategies' and to develop a structured outline for the questionnaires (linking specific types of questions and attributes, to particular valuation 'techniques'). They also developed some preliminary ideas on sampling strategies. On October 20, 2011, staff from the GBRMPA were invited to join the team for the afternoon, being given (a) an 'update' on team deliberations, and (b) the opportunity for further input into study, questionnaire and sampling design.

Most apparent from all workshops (including the three preliminary and the combined one with the GBRMPA in October) was the fact that stakeholders were grappling with issues that could benefit from information about both total and marginal values. For example, some stakeholders simply wanted to be able to raise public awareness of the importance of the GRWHA or about the total value of some of its ecosystem services; others felt it important to be able to assess the way in which key values might be impacted by particular management changes (e.g. further reductions in water quality). As such, we realised that it was going to be important to use techniques that could allow us to consider a broad range of 'values', and that we needed to look at both the 'total' value (or importance) of some ecosystems services to residents and tourists, and also the likely response of residents and tourists to changes in those services ('marginal' values).

Moreover, the values identified for assessment comprised many non-use values (e.g. existence and bequest, aesthetics). As such, it was clear that we were going to need to use at least some stated preference techniques since the other techniques cannot estimate non-use 'values' (section 2.1.2). We were also cognizant of the fact that modern day Australia has a significant gap between rich and poor, so were keen to ensure that we used both monetary, and non-monetary assessment techniques.

In the end, we thus decided to develop a questionnaire that would allow us to use

1. a variation of the life-satisfaction approach to assess
    a. the 'value' of a wide variety of ecosystem services (benchmarked against some market goods and services);
    b. the effect of changes in those ecosystem services on overall quality of life (benchmarked against market changes).

2. the contingent valuation approach[6] to assess marginal changes for three of the key issues identified in (1b)
3. visitor expenditures to assess some of the tourism values

Further details about the way in which we developed and tested that questionnaire are provided in the following chapter.

[6] Nowadays, one of the most commonly used stated preference approaches is, arguably, choice modelling. Whilst this technique is particularly well suited to situations where one is attempting to assess trade-offs between a relatively small number of separable attributes, this was clearly not our situation given the large number of inter-related 'values' identified for assessment. As such, we did not pursue that technique as an option.

3 Developing, testing and refining questionnaires

3.1 The second set of workshops

3.1.1 General background

Information gleaned from the literature review was combined with information collected during the workshops to develop a preliminary set of draft questionnaires, thought to be able to meet the objectives of the project. Our initial list of 'values' to be assessed within the questionnaires included 23 items for residents and 30 for tourists – see Appendix 1 – and our initial list of management issues ('changes') to assess included:

- The potential impact of more oil spills, ship groundings or waste spills
- Water clarity/turbidity
- Potential congestion from more tourists
- Impacts of less coral
- Impacts of less fish (to look at, or to catch)
- Impacts of more rubbish
- Loss of top predators
- Higher prices (so could compare with other 'changes')

Our second set of workshops thus had several aims: to update stakeholders on progress, to provide people with another opportunity to ensure that our project was focusing on regionally relevant issues, to test parts of our questionnaire, and to narrow down the list of 'values' to be assessed within the questionnaires.

1.1.3 Logistical details

The first workshop was held in Townsville on 24 April with representatives from GBRMPA and JCU. (Attendees: Stephen Sutton, Milena Kim, Amy Thompson, Hilary Skeat, Chris Briggs, Melissa Bos, Margaret Gooch, Renae Tobin, Deb Packman, Eline Kjoerven and Richard Quincey)

The second workshop was held in Brisbane on 8 May with industry representatives related to fishing, including DEEDI, DERM, Sunfish (recreational sector), and the Qld Seafood Industry Association (QSIA). (Attendees: Brigid Kerrigan, Michelle Winning, Kirrily McInnes, Jim Higgs, M C Dunning, Randall Owens, John Bennett, Eric Perez, Bill Sawynok, Tony Ham, Mark Lightowler and Eddie Jebreen)

The third workshop was held in Cairns on 9 May with representatives from the Alliance for Sustainable Tourism, Tablelands Tropical Tourism, GBRMPA (marine), QPWS, DERM, DEEDI, Cairns Regional Council, tour operators and accommodation houses. (Attendees: John Courtenay, Ron Birkett, Peta Nott, Amanda Riches, Michelle Thompson, Phil Laycock, Kym Sheridan, Ben Cropp, Dominic Waddell, Sheena Walshaw, Dr Peter Wood, Doug Ryan, Katrina Houghton, Diane Jarvis, Chris Kinnaird, Paul Fagg, Max Shepherd, Alan Wallish and Tim North)

At the beginning of each workshop, researchers provided participants with an update of progress, and outlined the aims of the workshop.

Participants were then asked to:

1. Participate in a cognitive mapping exercise (described in more detail in section 3.1.2)
2. Participate in an exercise designed to identify (a) clarify wording and intent of WTP questions and (b) a realistic range of values to be used in them

3. Complete (draft) questionnaires
4. Discuss problems with the draft questionnaires, making suggestions for change and improvement.
5. Discuss proposed sampling strategies, making suggestions for change and improvement.

3.1.2 WTP exercises

As with all stated preference studies, when conducting CV studies questionnaire design is critical since different question formats generate different estimates (Kealy and Turner, 1993 and Ready et al., 1996). We therefore drafted some initial WTP 'scenarios' (Appendix 2) asking workshop participants to comment on the way in which those scenarios were described (in words, and in pictures).

But it is not just the 'words' and pictures used in CV studies that are important: one must also decide how to 'elicit' WTP responses. The most common ways of doing so include: open-ended questions (e.g. simply asking people how much they are willing to pay without prompting), dichotomous choice (e.g. asking people if they would, or would not, be willing to pay "$X) approaches and payment card (PC) approaches (e.g. presenting respondents with a list of values, and asking them to indicate the maximum amount they would be willing to pay). Many researchers have considered the pros and cons of these approaches[7] - suffice to say here, that no single approach is without flaw.

In this study, we chose the PC approach – largely because we sought to minimise cognitive / respondent burden. But we were cognisant of its problems; most particularly that estimates of WTP will be influenced by the range of dollar values provided in the question (Cameron and Huppert, 1989 and Farr *et al.*, 2013), anchoring effects (Arrow *et al.*, 1993) and the interval size displayed on the card can influence responses (Cameron and Huppert, 1989). As such, it is crucial to test the range of values presented – as we did in these workshops and afterwards.

3.1.3 Cognitive mapping exercises

Recognising that respondents to our survey were unlikely to be willing to assess excessively long lists of 'values' (or attributes), we set out to find ways of shortening the lists generated from the first workshop. Simplistically, our aim was to identify values that could be presented collectively (e.g. swimming and snorkelling; fishing and boating). The MEA and TEV frameworks discussed above, provided researchers with some ideas about how values might be grouped, but researchers were also interested in hearing the thoughts of others. So rather than presenting people with a framework developed elsewhere, and asking for validation (or otherwise), we produced a set of cards that had pictures and words depicting the different types of 'values' identified during the *preparatory* phase of the project (in

7 Discussing and analysing, for example: respondent familiarity with different types of choice situations (Arrow *et al.*, 1993 and Reaves *et al.,* 1999); anchoring effects and starting point bias (Mitchell and Carson, 1989; Arrow *et al.,* 1993; Cameron and Quiggin, 1994; Holmes and Kramer, 1995; Herriges and Shogren, 1996); the possibility that DC approaches, despite being endorsed by the NOAA Panel (Arrow *et al.,* 1993), can occasionally inflate variance, mean and median WTP estimates (Walsh *et al.,* 1989; Kristrom, 1997; Brown *et al.,* 1996; Welsh and Poe, 1998); and cognitive/respondent effort (Cameron and Huppert, 1989).

workshops and in the literature review) - see Appendix 1. We then used these pictures in a series of cognitive mapping exercises, described below.

In the first instance, participants were given the pile of 23 pictures, representing 'values' identified in the previous workshops. They were then asked to sort the pictures into groups that "go well together". The following was given as an (unrelated) example to explain what we wanted them to do:

> *Let's look at these three cards: A tree with a bird sitting in it; a tree with a person sitting under it; and a pile of wood. If I were asked to sort the cards into piles that 'go well together', I would probably put the first two together (reasoning that the bird and the person could both use the tree), but put the other card separately. This is only my opinion, and you might have another opinion.*
>
> *Today we are interested in hearing YOUR opinion about some of the values associated with Tropical Rivers. And we would like you to play a similar 'game' with this larger group of cards, showing us which values you think 'go well together' … Please remember, there is no 'right or wrong' way to group these cards.*

We recorded which pictures were grouped together (and which were not).

3.2 Post-workshop activities

3.2.1 Further tests of the WTP scenarios

We used insights from the workshops (and from subsequent discussions with other key stakeholders – particularly DPI for the top predator questions) to reframe the WTP scenarios, and then tested them in different situations, namely with:

- Those attending each of three separate workshops described above.
- Fly-in-Fly-out miners, interviewed at Townsville's airport (awaiting flights out to the mines)
- Tourists visiting Magnetic Island (interviewed at the Magnetic Island ferry Terminal)
- Residents and tourists, interviewed at Townsville's strand.

In total, we collected data from 120 individuals, finding that respondents had little to no difficulty understanding the scenarios and that there was no need to have a bid card with a top-end value greater than $2000.

3.2.2 More cognitive mapping exercises

When testing the WTP scenarios, we also conducted cognitive mapping exercises (like those done in the workshops). To analyse the data from these exercises, we constructed separate matrices (one for each respondent). Each of the 'values' presented on the cards represented both a column heading and a row heading, giving a symmetric matrix. Binary entries indicated whether or not the respondent placed the two values in a group together (entry = 1), or whether the values were separated (entry = 0). The matrices were subsequently added, producing a single 'similarity' matrix – see Table 3.

Interestingly, out of a total of 253 potential 'pairs', there were only 15 for which more than one-half of the 120 respondents thought the items *went well together.* Evidently, respondent views on these types of things are quite heterogenous. Consequently, we decided not to markedly shorten the list of 'values'; instead combining some of the very obvious values (e.g. Iconic species and Plants & Animals where almost 85% of participants in the cognitive mapping exercises put them in the same group), but leaving others as separate, so that respondents had the ability to distinguish.

Table 3: Number of times respondents indicated that different 'values' *go well together* (Out of a maximum of 120).

	Iconic species	Plants & Animals	Bequest	Holiday	Research	Culture	Rec fishing	Protection	Bragability	Boating	Beach rec	Filter	Pretty	Clean	Tourism	Commercial fishing	Swimming	Food	Mining	Diving	Existence	Clarity
Plants & Animals	101																					
Bequest	49	47																				
Holiday	16	16	24																			
Research	28	28	26	6																		
Culture	22	22	28	10	43																	
Rec Fishing	10	9	13	31	13	14																
Protection	50	45	34	24	31	20	8															
Bragability	23	25	45	37	11	26	20	18														
Boating	10	13	16	68	8	14	56	14	32													
Beach rec	16	16	18	65	15	21	52	19	36	83												
Filter	38	39	22	8	31	21	9	72	12	8	14											
Pretty	24	22	37	47	15	19	18	22	45	37	35	16										
Clean	48	47	53	40	18	18	11	40	36	21	28	31	56									
Tourism	10	11	9	56	16	18	34	5	26	48	35	12	24	13								
Commercial fishing	4	8	6	7	21	13	39	11	8	9	7	11	3	4	46							
Swimming	16	15	16	70	7	10	50	18	37	83	83	6	35	33	36	3						
Food	8	7	10	21	14	19	50	10	15	21	11	13	19	16	34	55	16					
Mining	0	4	2	8	22	13	20	7	7	11	6	13	5	2	41	76	5	36				
Diving	38	46	28	46	12	12	43	14	38	65	64	10	29	31	28	8	74	11	5			
Existence	43	43	83	27	24	20	12	35	51	13	20	20	47	57	7	9	25	12	4	27		
Clarity	58	64	45	28	17	12	12	28	33	20	17	23	50	62	17	4	28	15	6	47	45	
Crowded	18	20	28	32	24	27	22	18	20	26	27	21	54	50	24	8	23	12	8	17	29	33

3.2.3 Pre-test of questionnaire

On the 12th of June, 2012, we distributed 58 (draft) questionnaires to people waiting for planes at the Cairns airport. We analysed responses, finding that the response rate for some questions were relatively low, and some respondents noted that the format of the questionnaire almost reminded them of an examination paper. We thus spent considerable time re-formatting the questionnaires, adding pictures and colours to increase the visual appeal. We also determined that the tourist questionnaire was simply too long, so opted for a 'split sample' approach (discussed below) in the final version.

3.3 Final questionnaires

A copy of (one version) of the resident questionnaire is provided in Appendix 3; Appendix 4 and Appendix 5 contain our two different tourist questionnaires, and the discussion below provides a brief explanation of the core parts of each.

3.3.1 Core sections

Core sections of our resident questionnaire thus included questions about

- The socio-demographic background of respondents (age, income, etc)
- How often residents go to the GBRWHA, and what they do while there
- The importance of various 'goods and services' provided by the GBRWHA to overall quality of life and satisfaction with those goods and services[8].
- Satisfaction with life overall[9]
- People's perceptions about the way in which their overall quality of life would be affected by changes in various environmental and market factors (e.g. higher prices, reduced water clarity) [10].
- Willingness to pay (WTP) for improvements in various environmental attributes in the GBRWHA.

When developing the tourist questionnaire, we sought to keep questions similar (to enable comparisons) but altered the wording of some segments. As such, core segments of this questionnaire included questions about:

---

8 This question will allow us to:

- Rank goods and services in terms of (a) their 'total' importance to quality of life & (b) satisfaction
- Look for different responses from different 'types' of people in different regions
- Compare importance and satisfaction, looking for significant 'gaps'
- Calculate an INDEX of dissatisfaction (after Larson *et al.,* 2013) for policy prioritisation

[9]Responses to this question will be compared to responses about questions relating to satisfaction with GBRWHA goods and services. They could also be used in a LS model – in essence, regressing responses to the question about overall satisfaction with life against social, economic, demographic and biophysical/environmental factors to determine the marginal contribution of the environment to overall life satisfaction while holding other key factors constant. This is a non-trivial exercise (particularly given the complexities of collating data from multiple realms into coherently aligned geographic and temporal boundaries prior to estimating the model, so we are unlikely to be able to do this before end Dec 2014, but could potentially do so in subsequent research programs (NERP II?).

[10] This will allow us to draw inferences about the MARGINAL contribution of various environmental goods and services compared to income/prices

- The socio-demographic background of respondents PLUS background about travel party and origin
- How often visitors had been to the GBRWHA in the past and what they did (or planned to do) while on this particular trip
- Questions about the importance of various 'goods and services' to their overall decision to come to the region (in contrast to the resident survey which asked about importance to overall quality of life).
- Their satisfaction with the trip overall (in contrast to the resident survey which asked about satisfaction with life overall)
- The way in which their decision to come to the region would have been affected by changes in various environmental and market factors (in contrast to the resident survey which asked about the way these things would affect overall quality of life).
- Expenditure while in the area
- Willingness to pay for improvements in various environmental attributes

In other words, our tourist questionnaires sought to collect all of the information collected from residents, and then some additional information about their travel patterns, travelling companions and expenditure while in the region. This resulted in a lengthy questionnaire. Pre-tests indicated this was likely to have an adverse effect on response rates, we thus decided to develop two different versions of the tourist questionnaire: one omitting WTP questions (version A), and one omitting expenditure questions (version B).

3.3.2 Randomised order of some questions

The literature indicates that respondents are highly sensitive to the order in which one presents questions – particularly if asked to evaluate a long list of items. To minimize problems associated with this, we decided to produce 24 different versions of the resident surveys: all surveys contained exactly the same set of questions, but the order in which the 'values' being assessed (on pages 2 and 3 of the questionnaire) varied. We also varied the order of our three WTP questions (so the same 'scenario' wasn't always presented first), and the bid-range presented to respondents on the WTP payment card (some had $500 as the highest value, some had $750, some had $1000 and some had $2000), since respondents can be sensitive to this (Farr, et al., 2013).

Those same question were randomised in the tourist surveys, so there were, in total, 48 different versions of the tourist questions (24 of Type A, and 24 of Type B)

3.3.3 Chinese and Japanese Translations

We were also mindful of the fact that International tourism is important in the GBRCA – particularly in Tropical North Queensland (see Tourism Queensland, 2013). Amongst those visitors, the most common countries of origin include: China, Japan, the United Kingdom, the USA, New Zealand and Germany (in that order– see Table 4). Recognising the importance of both the Chinese and Japanese tourism markets, we thus decided to translate the (tourism) questionnaires (all 48 different versions) into these languages. This was done in three steps:

a) translating the English version of the questionnaire into Chinese and Japanese;
b) having two other people who had never seen the English versions of the questionnaires to translate the Chinese and Japanese versions back in to English;

c) comparing the back-translated English versions of the questionnaires with the original versions to check for errors and inconsistencies.

Table 4: International visitors to Tropical North Queensland during the March 2012 Quarter – by country of origin
(Source: Tourism Research Australia, 2012)

Country of residence	Total number of visitors	Percent of total visitors
China	88,000	14.43%
Japan	86,000	14.10%
United Kingdom	79,000	12.95%
USA	74,000	12.13%
New Zealand	45,000	7.38%
Germany	42,000	6.89%
Canada	23,000	3.77%
France	20,000	3.28%
Scandinavia	19,000	3.11%
Hong Kong	13,000	2.13%
Italy	11,000	1.80%
Netherlands	10,000	1.64%
Korea	10,000	1.64%
Switzerland	9,000	1.48%
India	8,000	1.31%
Taiwan	5,000	0.82%
Singapore	2,000	0.33%
Malaysia	2,000	0.33%
Indonesia	1,000	0.16%
Thailand	1,000	0.16%
Other Europe	27,000	4.43%
Other Asia	4,000	0.66%
Other countries	31,000	5.08%

Many European and Indian visitors speak English, and many visitors from Taiwan and Singapore speak Chinese, so our three different language versions of the questionnaire covered an estimated 90% of the international tourism market in the Far North (Table 4).

4 Sampling

Different people are likely to 'value' the environment in different ways, so the final outcome of any valuation exercise will depend, crucially, upon WHO is included in the study (Pagiola, 2004). Some people, for example, are likely to feel that the environment is of value largely because it provides food and shelter; others may place much greater emphasis on recreational, aesthetic or spiritual factors. If one only includes the former group in a study of 'values' one will, necessarily, conclude that the environment is of most value because of the food and shelter it provides. Conversely, if one only includes the latter group in a study of 'values', then one will, also necessarily, conclude that the environment is of most value for recreational, aesthetic and spiritual factors.

For this project we decided to limit our study to include only those living in or visiting the Great Barrier Reef Catchment Area (GBRCA) – see Figure 10. As such our findings only reflect the views of these people.

In 2007, Access Economics defined this area geographically as a set of Local Government Areas (LGA) which have rivers that flow into the GBR Marine Park (MP) – Access Economics, 2007. The western boundary more or less follows the Great Dividing Range peaks, but covers the whole width of the Cape York Peninsular at the northern end. The southern boundary (of the Great Dividing Range) becomes more poorly defined, with the CA extending from north of Roma to the coast south of Bundaberg. The CA extends about 100km further south along the coast than the MP, as water from the Bundaberg River is carried north into the Park by currents, but excludes some parts of rivers that flow into the Bundaberg River. Major cities and towns within the CA are Cairns, Townsville, Charters Towers, Bowen, Mackay, Rockhampton, Gladstone and Bundaberg.

The Statistical Divisions (SD) of Northern, Mackay and Fitzroy are wholly within the Catchment Area (CA). Around 85 per cent of the Far North SD is within the GBRCA; the other 15 per cent in the south west of that SD is sparsely populated. The GBRCA also includes around 30 per cent of the Wide Bay-Burnett SD (Bundaberg is in the GBRCA, but Maryborough, Hervey Bay and Gympie are not) and the northern 20 per cent of the Darling Downs SD.

4.1 Tourist data collection activities

After having conducted the initial pre-test of the questionnaire at Cairns airport, we developed a sampling strategy that would enable us to allow for temporal, geographic, and sectoral differences in tourists. We did this because different types of tourists are known to frequent locations at different times of the year (e.g. domestic tourism often drops off in Northern Australia during the summer period; Chinese visitors are often only able to travel at certain times of the year).

We also expect different tourists to visit different regions, and to engage in different activities while there. So we adopted two different approaches: intercepting tourists at key locations; and eliciting the help of tourism operators when distributing questionnaires.

That said, when devising sampling strategies, we were mindful of the fact that more than 90% of visitors to the GBRMP go to either the Cairns/Cooktown or the Townsville/Whitsunday management areas (see Figure 1 for boundaries of management area, and Figure 11 for , which shows the number of visitors paying the Enviornmental Management Charge – EMC – in different management areas within the GBRMP). As such, we chose to concentrate most data-collection effort in those areas.

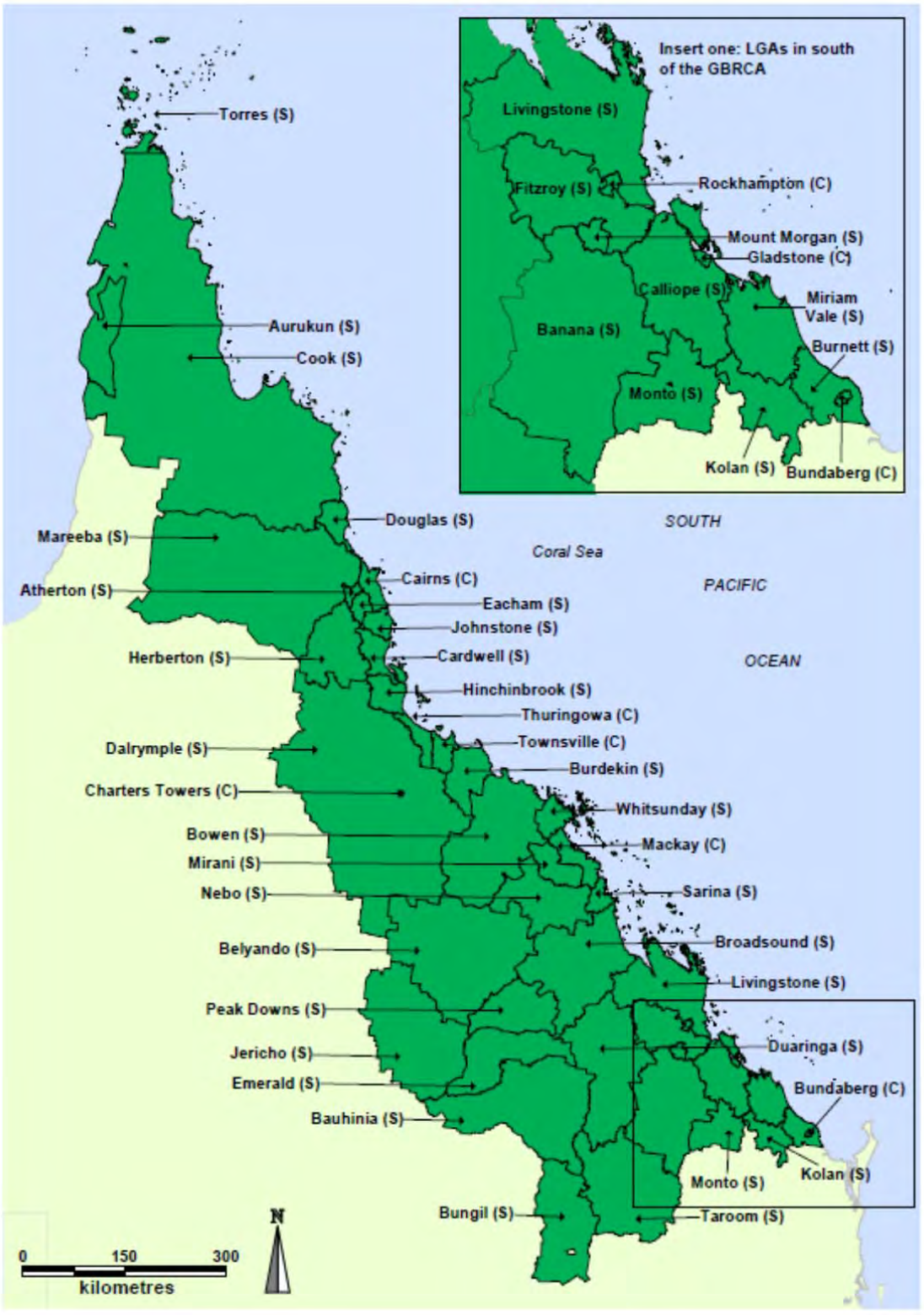

Figure 10: GBRCA
(Source: Access Economics Pty Ltd, 2007, Figure 2.1)

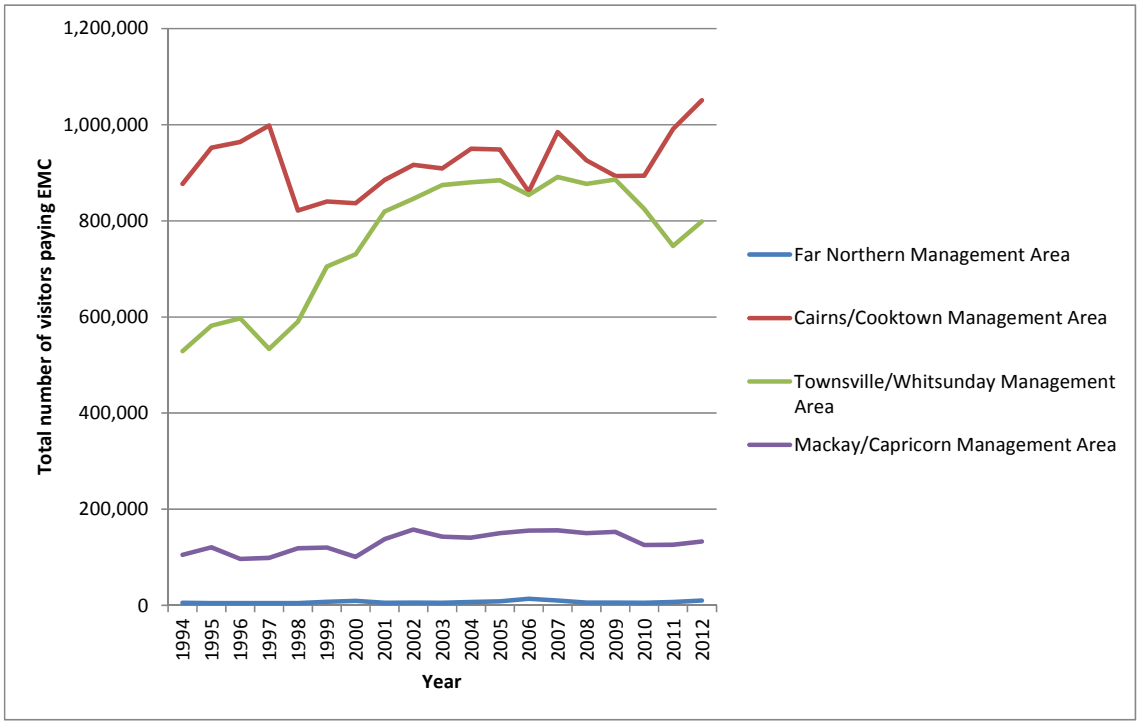

Figure 11: Visitor numbers to different parts of the GBRMP

(Chart produce using data sourced from: GBRMPA, 2013)

4.1.1 Intercepting tourists

When collecting data from tourists one needs to intercept respondents at a time that is convenient for them --- someone is unlikely to be willing to complete a questionnaire while waiting to bungy jump. Using insights gleaned from the literature and our workshops (attended by tourism researchers and operators with much experience in data collection), we determined that the best times to approach tourists were as follows:

- In airports after they have checked in and while waiting for their plane. Interestingly, this approach worked well for most cohorts, except the Chinese at the International terminal in Cairns: rather than sitting and waiting for the plane, a large proportion of this group spent their time shopping and were thus unwilling/unavailable to answer a questionnaire. Instead, we intercepted Chinese visitors at the domestic airport (where shopping did not seem to be such a high priority).
- On boats/ferries: wait-times prior to ferries are generally too short to allow people time to complete questionnaires, and seats are rarely provided, but people are often happy to complete a questionnaire while the boat is travelling.
- While relaxing at beaches/lagoons
- In and around camp-site/caravans late in the afternoon (after the tourists have returned from a day of activity, but before preparing dinner).

We thus sought permission from airports, ferry/boat operators, caravan-park owners and local governments (for the beach/lagoon questionnaires) in Cairns, Port Douglas, Townsville, Bowen, Airlie Beach, Rockhampton and Yeppoon to collect data from visitors at those

locations. We visited those locations at various times throughout the year, using Mandarin and Japanese speaking assistants when distributing questionnaires to Chinese and Japanese visitors[11].

4.1.2 Distributing additional questionnaires through willing tourism operators

To ensure that we also collected data from visitors not frequenting the locations above, we enlisted the help of a stratified random selection of tourism operators between Cooktown and Gladstone.

When selecting operators, we started by using the yellow-pages and tourism web-sites to compile a list of 673 tourism operators between Cape Tribulation and Gladstone. We divided those operators between the accommodation sector (further subdivided by type – e.g. backpacker hostel, bed and breakfast, 3 4 or 5 star motels), tour operators (marine and terrestrial) and tourism 'attractions' (e.g. museums, information centres, skyrail). We randomly selected two of each group, in each location, and then contacted the operators to see if they would be willing to make our questionnaires (with reply paid envelopes) available to their customers. In total, 36 operators agreed; we sent a random selection of different types of questionnaires to them and received a total of 203 completed questionnaires in the mail from their customers.

4.1.3 Number and distribution of responses from tourists

Table 5 shows how many questionnaires were collected from different locations, at different times of the year. Approximately 50% of all respondents were visiting the Cairns/Cooktown area, 40% were in the Townsville/Whitsunday management area and 8% were in the Mackay/Capricorn region. This largely mimics the visitation patterns evident from the GBRMPA's Environmental management charge (EMC) data (Figure 11).

[11] These were only distributed at Cairns airport, given the relatively low numbers of these visitors in other parts of the GBRCA. This was also confirmed during our first trip to the other regions).

Table 5: Temporal and geographic distribution of tourist respondents

Management area	Location	Mid-June 2012 - Mid Sep 2012	Mid Sep 2012 - Mid Dec 2012	Mid Dec 2012 - Mid Mar 2013	Mid Mar 2013 - Mid June 2013	Missing	Total
Cairns /Cooktown	Airport						
	English	94	119	35	162	1	411
	Chinese		99	61	55	1	216
	Japanese	54	121	46	22		243
	Caravan Park/ Backpacker		32	3	22	6	63
	Beach/ Lagoon/ Rockpool		79	152	190	1	422
	Resorts/Apartments/ Motels	1	11			15	27
Townsville /Whitsunday	Airport	62	143	121	219		545
	Ferry Terminal	50	69	54	79	3	255
	Caravan Park/ Backpacker	30	49	16	67	8	170
	Beach/ Lagoon/ Rockpool		30		13		43
	Other	15	5			1	21
	Resorts/Apartments/ Motels	17	44	4	1	21	87
Mackay /Capricorn	Airport	102			17		119
	Ferry Terminal				13		13
	Caravan Park/ Backpacker	21	2		30		53
	Other	10	1		1	3	15
	Resorts/Apartments/ Motels	10	5			4	19
Missing		3	3		12	3	21
Total		469	812	492	903	67	2743

Note: There were 225 tourists from China: 216 from Cairns area and 9 from Airlie Beach area. Chinese tourists from Airlie Beach area have not been reported separately. There were 243 tourists from Japan: 240 in Cairns area and 3 in Airlie Beach area. Japanese tourists from Airlie Beach area have not been reported separately. Those with 'missing' locations were those returned via post, with post-marks indistinguishable.

4.2 Residential data collection activities

Discussions during our workshops indicated that stakeholders were interested in learning about residents from all parts of the GBRCA. So we chose to aim for a geographically stratified random sample. We thus started the sampling process by identifying postcodes that lay either partially or entirely within the GBRCA using the ABS Census website of 2006 Census data by location. A database of residential addresses was purchased from *Australia On Disc*. This database contains over 6.5 million names and addresses, with over 1.2 million records for Queensland. The database is updated biannually, with a major update at the start of the year and a maintenance update midyear. The database was purchased after the midyear update in 2012.

4.2.1 Residential pre-test and mail out

Using the purchased database, we randomly selected 230 households (≈ 2 from each of the postcodes identified above), sending a copy of our survey to them (September 2012). Following the Dilman (2007) methodology, we sent a reminder letter with replacement questionnaire to those who had not responded three weeks later, with a third reminder another three weeks after that. Of the 230 surveys sent out, we believe that only 197 questionnaires reached their intended recipients: some were returned unopened with messages such as 'no longer at this address'. We received 48 completed questionnaires, giving an overall response rate of 24.4 %. Respondents seemed to have understood the questions, with no obvious problems in design, so we moved on to implement our main survey.

Again using the purchased database, we randomly selected about 100 households from each postcode (4800 households in total). As noted in section 3.3.2, however, we had 24 different versions of the survey (with some of the questions presented in a different order) – and it was important to ensure that we did not end up with a situation, for example, where postcode X, only received version A, whereas postcode Y only received version B. So we sent 100 questionnaires to each postcode--- but each postcode was sent approximately 4 of each of the 24 different versions of the questionnaire to ensure proper randomization – see Table 6.

Table 6: Distribution of different versions of the questionnaires across postcodes

	Questionnaire				
Postcode	Version 1	Version 2	….	Version 24	Total
A	4	4		4	96
B	4	4		4	
C	4	4		4	96
…					
TOTAL	200	200		200	4800

As for the pre-test, we followed Dilman's (2007) methodology, sending the first batch of questionnaires out at the end of October, 2013, with the second batch 4 weeks later, and the final reminder/replacement in April 2013. Of the 4800 sent out, 823 were returned unopened (incorrect addresses, or recipient having moved away). So we estimate that only 3977 reached their intended recipient. We received 902 completed questionnaires, giving an overall response rate of 22.7%.

4.2.2 Supplementary activities

Some demographic groups (e.g. well educated females) are more likely to respond to mail-out surveys than others (e.g. young males, Indigenous people). So we set out to redress this problem with supplementary data-collecting activities. First, when research assistants visited airports, lagoons (etc) to intercept tourists, they always carried residential questionnaires as well, so that we could take advantage of incidental intercepts. We also engaged an Indigenous researcher (Leon Apo, from the Centre for Indigenous Education and Research, Australian Catholic University) to help collect data from within Indigenous communities. These extra activities gave us an additional 663 responses.

4.2.3 Number and geographic distribution of responses from residents

In total, we received 1592 completed (residential) surveys. As shown in Figure 12, the geographic distribution distribution of resident responses is good: we received at least ten completed questionnaires from more than 86 postcodes that are adjacent to the GBR. Notable exceptions (where we did not receive at least 10 completed responses) include the postcodes on the far north of the cape and the Torres Strait, the postcode that includes Cooktown, and the postcodes near Camila (4738 and 4739). As expected, response rates were generally highest from the areas adjacent to the GBRWHA.

Note also that not all 'residents' lived permanently within the catchment: 245 were, for the most part, employed in mining industries, army, trade and agriculture - some had a residence in the GBRCA, but spent much time working inland (e.g. flying in and out of century mine) whilst others had a home/residence outside the GBRCA, but spent much time working in the GBRCA (e.g. those living in Brisbane, and working in one of the mines near Mackay, members of the armed forces living in Darwin, but spending many months training in the Capricorn area).

In some parts of section 5, we have therefore, divided our 'resident' sample into three:

- Non-Indigenous residents of the GBRCA – 1249 respondents in total from 97 different postcodes.
- Indigenous residents (including Aboriginal and Torres Strait Islanders) – 98 completed surveys.
- Other residents –this group includes the 245 referred to above and an additional 47 respondents who did not provide us with their residential postcode.

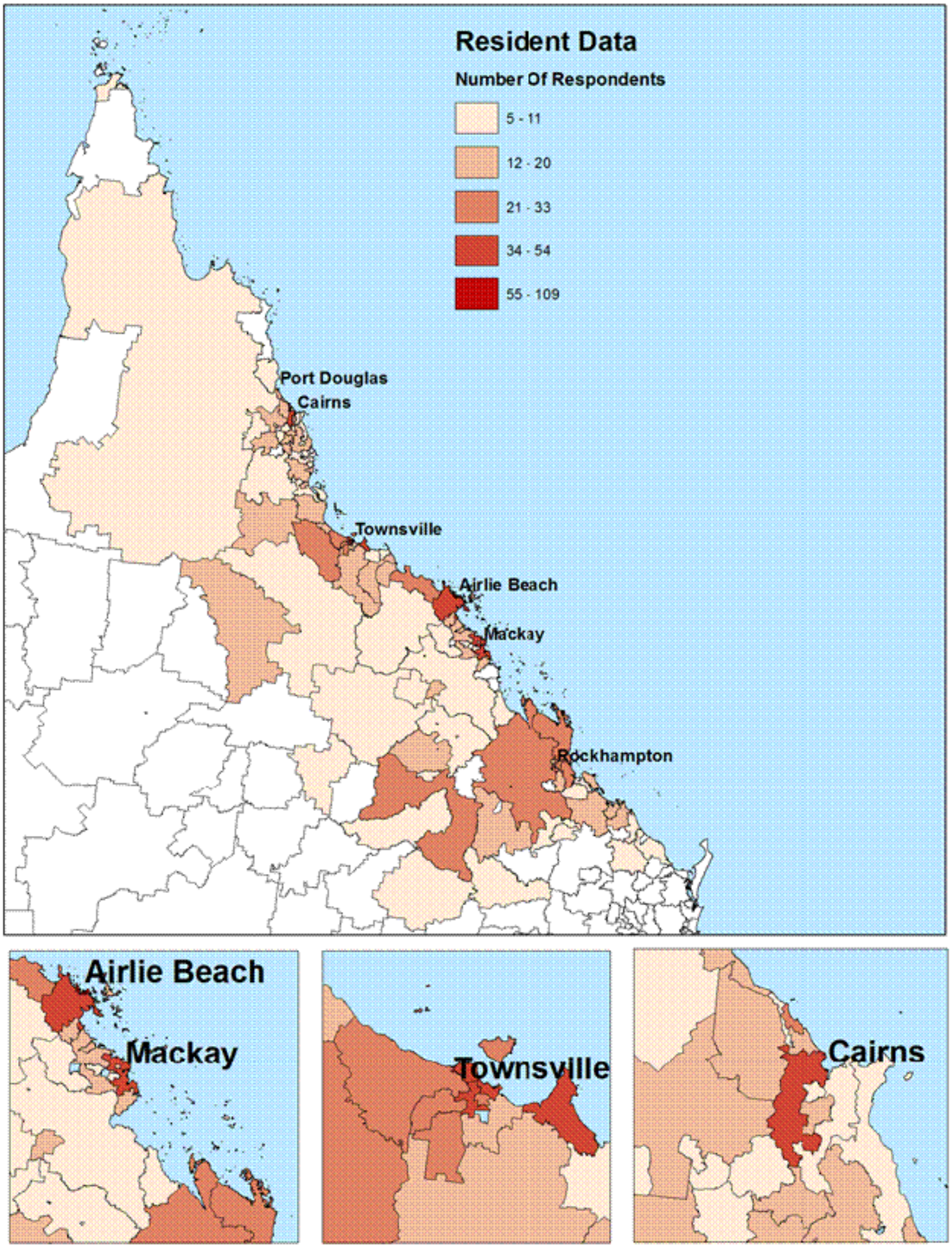

Figure 12: The number of resident respondents – by postcode

5 Descriptive statistics from our samples

This section of the report provides a descriptive summary of data collected. Readers are encouraged to look at the specific questions when looking at these summaries, since – as with all social surveys, responses are highly sensitive to the way in which questions are asked (Appendix 3 – resident survey; Appendix 4 – version A of the tourist survey; and Appendix 5 – version B of the tourist survey).

5.1 Demographic background – Residents and Tourists

In total, 50.3% and 54.9% of residential and tourist respondents, respectively, were female. Approximately 6.6% of residential respondents self-identified as either Aboriginal or Torres Strait islander or both; the figure was higher for tourists (13.5%) – see Table 7.

Table 7: Indigeneity by type of respondent (resident or tourist)

	Residents	Tourists
Both	13	279
Aboriginal	73	30
Torres Strait Islander	12	6
Neither	1384	2068

More than half the tourists (53.3%) who answered the survey were between 20-40 years old while 44.3% of residents are aged between 40-60 years (Figure 13); 31% of residents and 52% of tourists completed university degree (Figure 14).

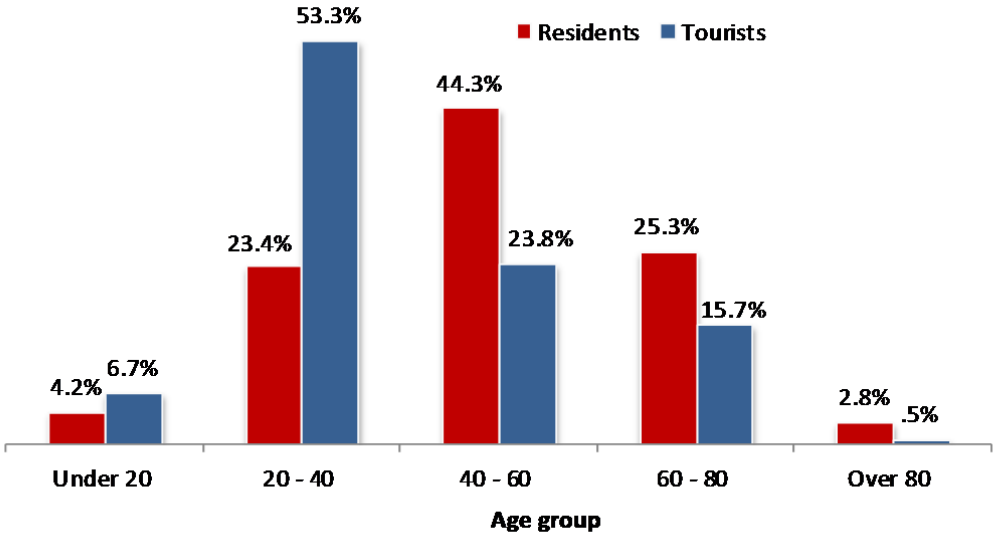

Figure 13: Age by type of respondent (resident or tourist)

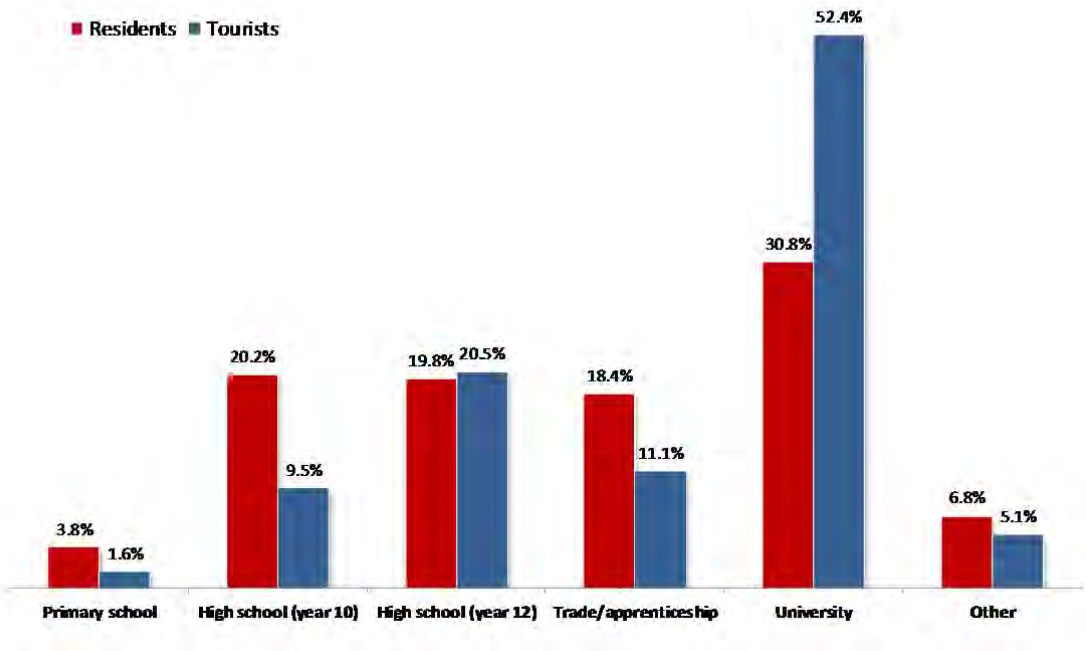

Figure 14: Highest level of education completed by type of respondent (resident or tourist)

More than one-quarter of both residents and tourists noted that the Government / Health / Education sector was their main source of income (Figure 15). Mining, Agriculture/Forestry and, to a lesser extent tourism, were much more important sectors (in terms of income dependency) for residents than they were for tourists. A slightly larger percent of tourists were in the highest income bracket than were the residents (Figure 16)

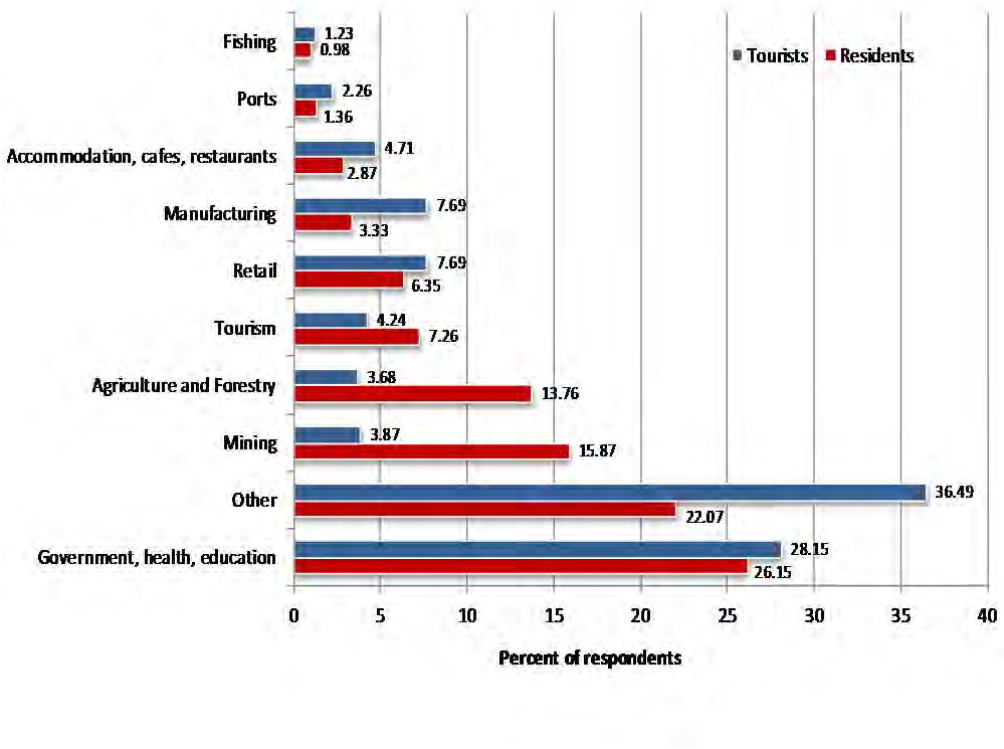

Figure 15: Main income source by type of respondent (resident or tourist)

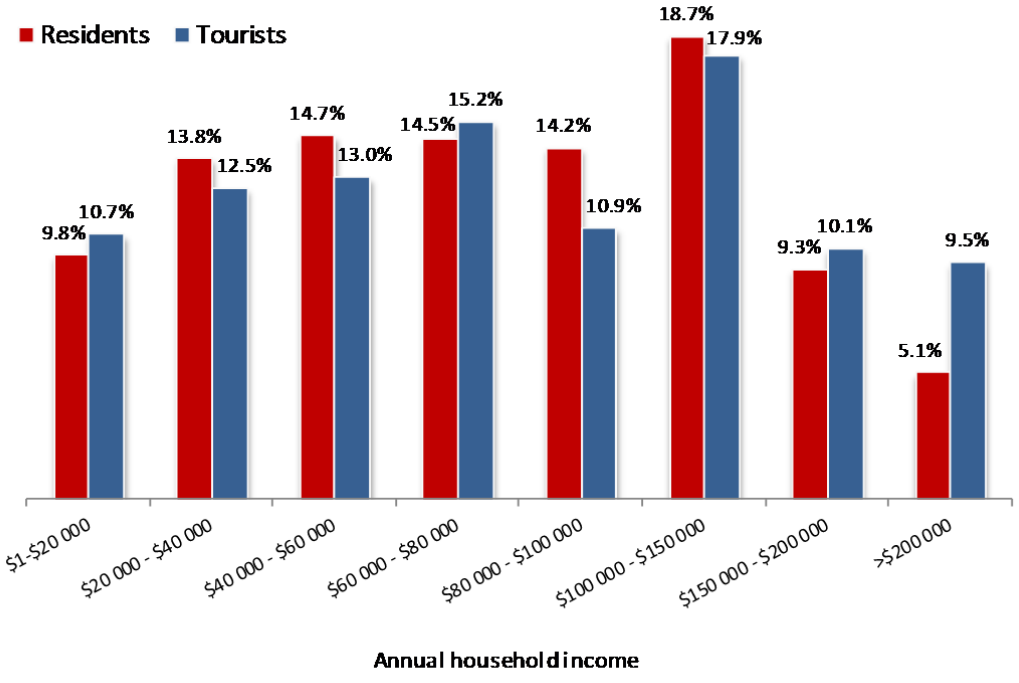

Figure 16: Income by type of respondent (resident or tourist)

An overwhelming 74% of residents and 78% of tourists revealed they do not contribute to or volunteer for any conservation organizations (Figure 17). Nineteen per cent of residents and 13% of tourists contributed nationally and locally.

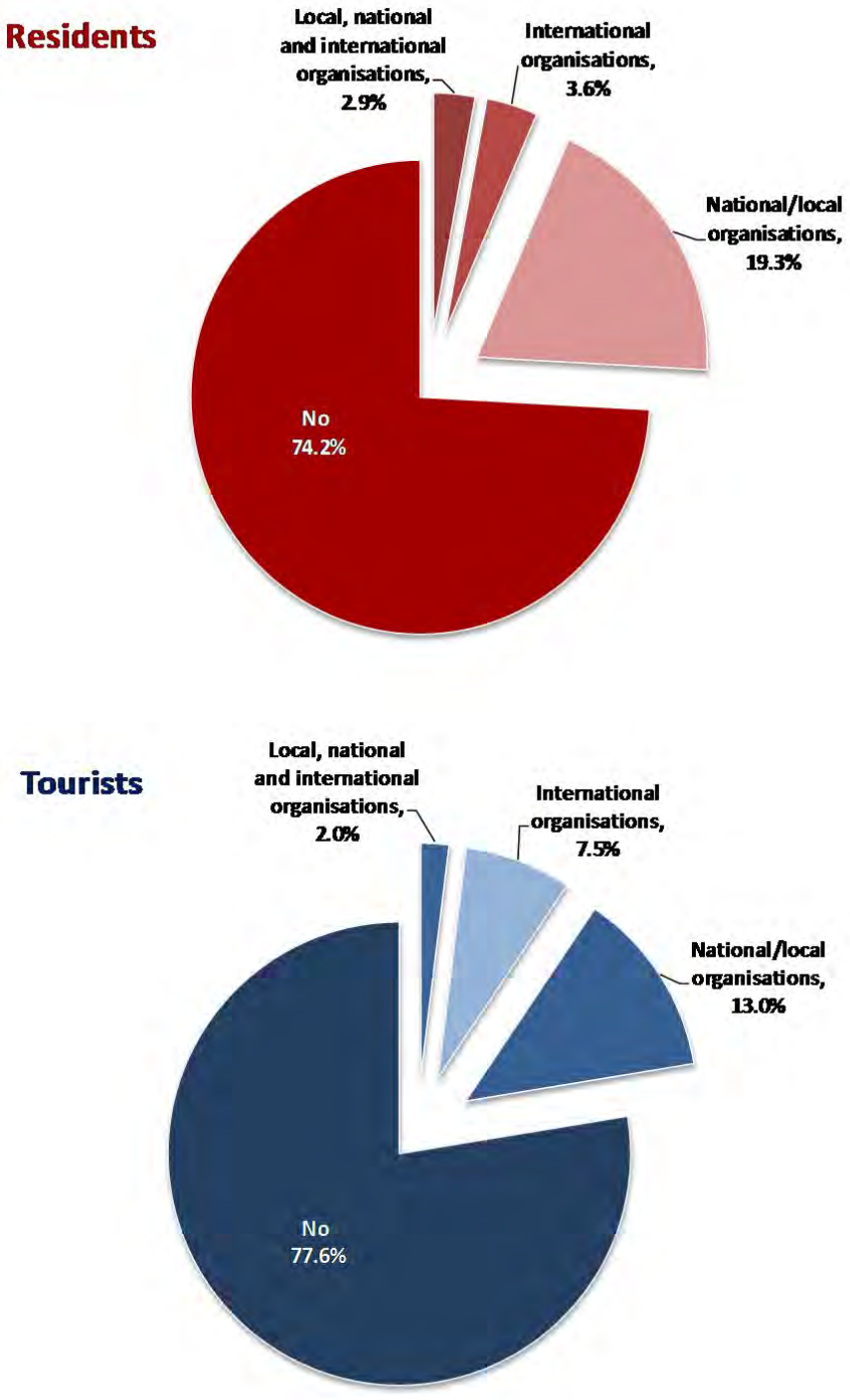

Figure 17: Do you contribute to any type of conservation organisations? Residents and Tourists compared

Almost 47% of residents and 18% of tourists self-identified as 'recreational' fishers; As might have been expected, the inland regions tend to have a lower proportion of (residential) respondents who self-identified as recreational fishers than those closer to the coast.

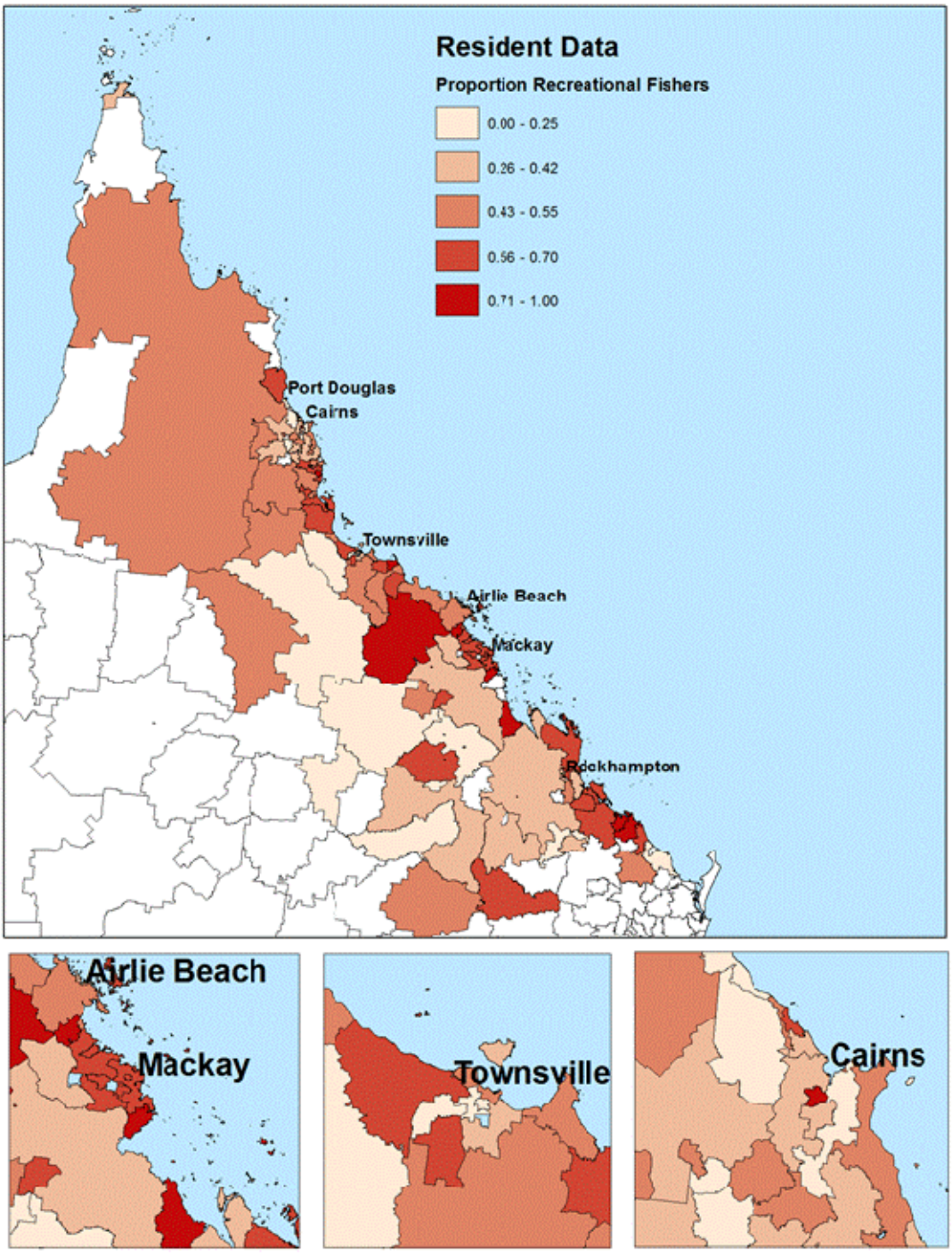

Figure 18: Proportion of residents self-identifying as recreational fishers – by postcode

5.2 Resident specific questions

Most residents (84.5%) had been to the GBRWHA at least once in their lives. The majority (40%) had spent about a day on their most recent trip; 18% had spent 2-3 nights on their most recent trip, and nearly 22% had spent 4 nights or more (Figure 19).

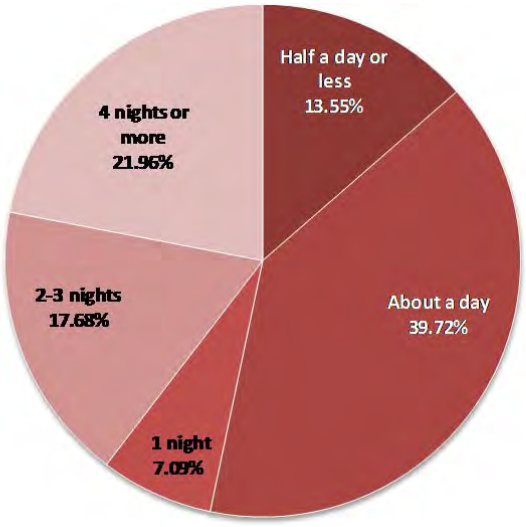

Figure 19: Length of stay in GBRWHA region on most recent trip (residents only)

Residents were also asked about how satisfied they are with their life as a whole. The majority of respondents indicated that they were either very satisfied (43%) or satisfied (44%) with their life; only 5% said that they were unsatisfied or very unsatisfied (see Figure 20).

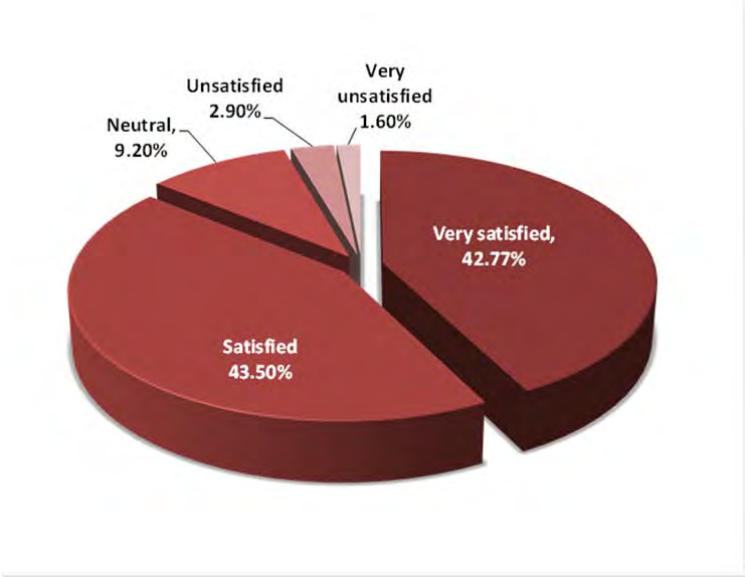

Figure 20: Resident satisfaction with life overall

As shown in Figure 21, however, there is considerable variation in mean responses across space: with some regions (e.g. those inland from Townsivlle and Rockhampton) recording much lower mean satisfaction scores than other areas.

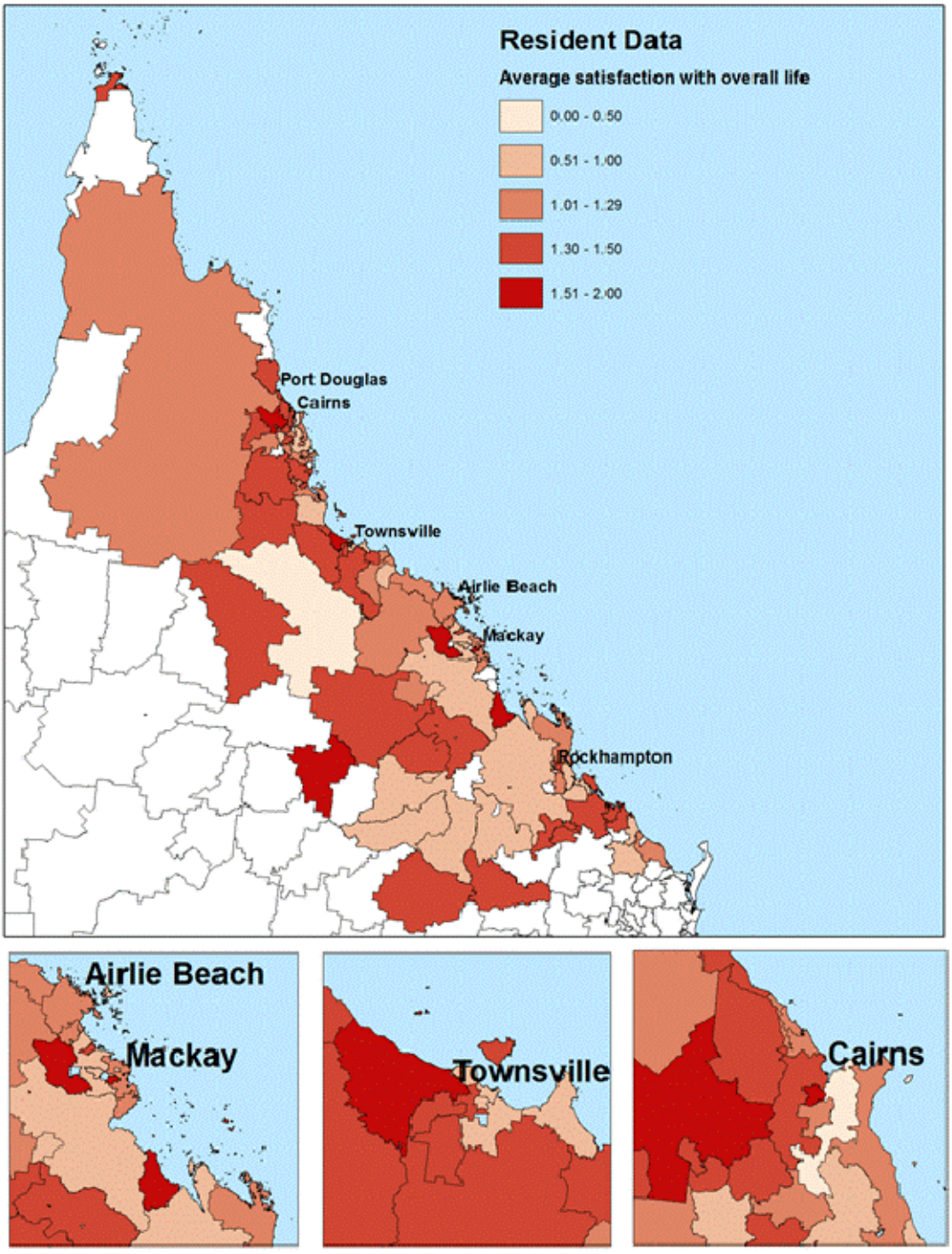

Figure 21: Resident satisfaction with life overall – by postcode

5.3 Tourist specific questions

In total, 2743 tourists completed the survey and for more than half (57%), this was their first visit to this region (Figure 22). The median number of nights spent along the coast near the GBRWHA was 5.

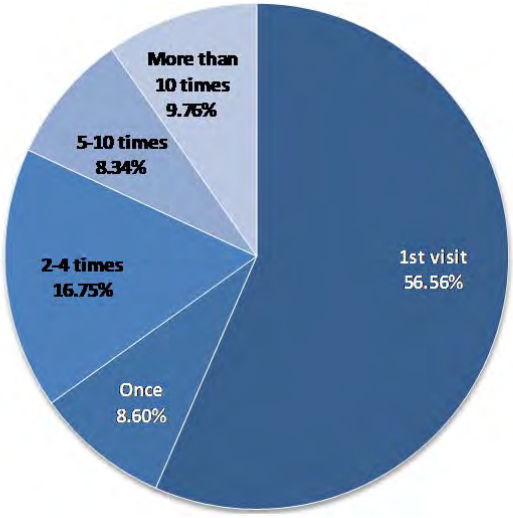

Figure 22: Number of previous visits to GBRWHA (tourists only)

More than one-third of tourists (36.24%) were travelling as a couple; almost 20% were travelling with friends (see Figure 23).

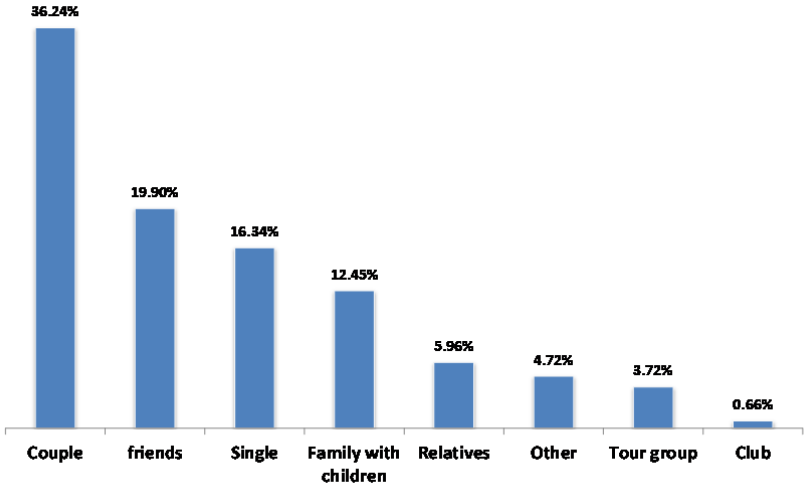

Figure 23: Types of travel party (tourists only)

Almost 55% of tourists (1506 of respondents) were international visitors the rest were domestic visitors (see Figure 24). The majority of international visitors (659) come from Europe. Most domestic visitors were from Queensland (41%); 24% were from NSW and 22% from VIC (Figure 25).

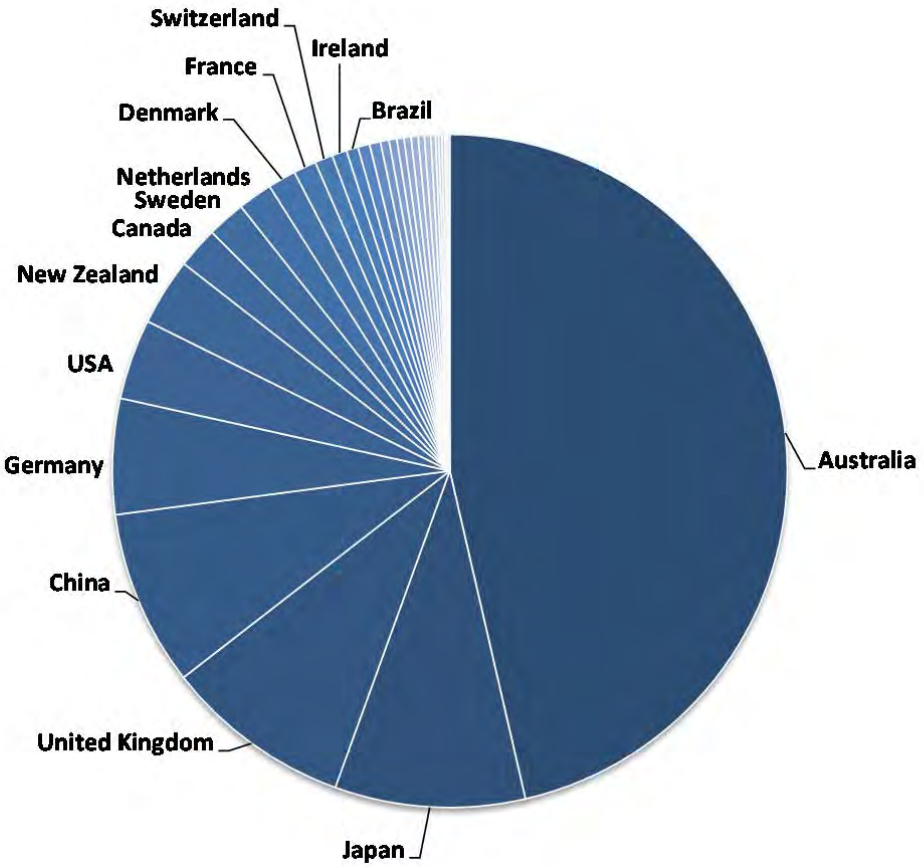

Figure 24: Country of origin of tourists

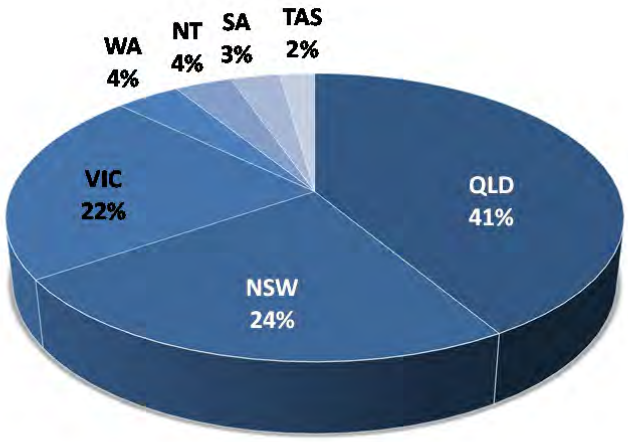

Figure 25: Origin of the domestic visitors

We did not ask tourists about their satisfaction with life overall, instead, asking how they are satisfied with their experience in the GBRWHA as a whole (see Figure 26). The majority of tourists were either very satisfied or satisfied with overall experience in the GBRWHA. The

most satisfied tourists were from Japan (91%) and Europe (89%); domestic tourists were somewhat less satisfied.

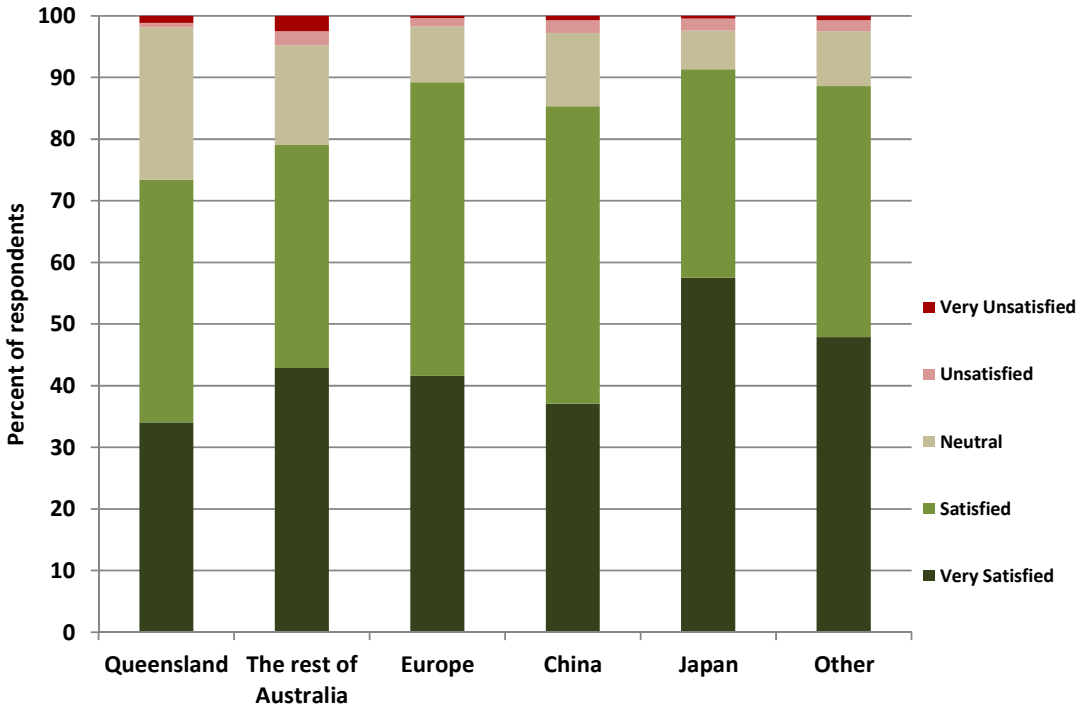

Figure 26: Tourist satisfaction with overall experience – by place of origin

Visitors were also asked how this trip met their expectations and how likely it is that they will return to visit the region in the future. Nearly 40% of tourists from Japan indicated that this trip was well above expectations while only 17% of visitors from China fell into the same category (Figure 27).

More than 60% of visitors from QLD and 56.8% from the rest of Australia indicated that they would return to the region in the future (Figure 28). Those figures were lower for international visitors, although 41% of Japanese and 39% of European and Chinese tourists said that might come back for another visit.

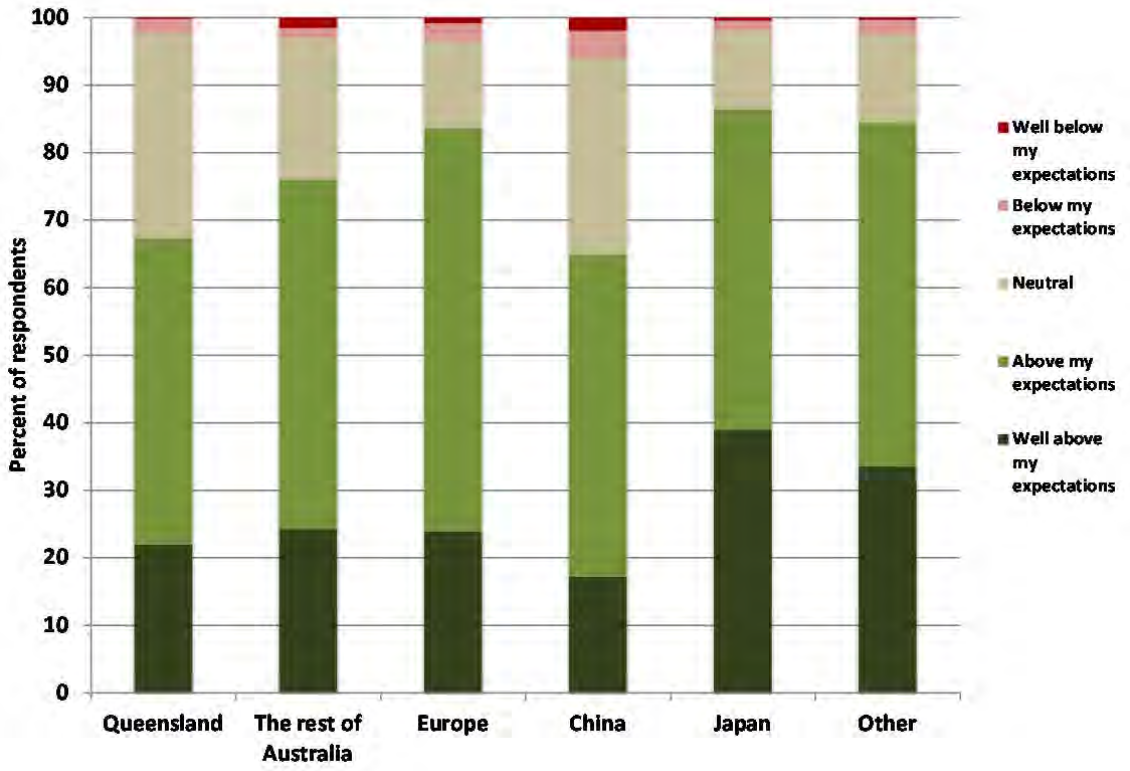

Figure 27: Did visit 'meet expectations'? – by place of origin

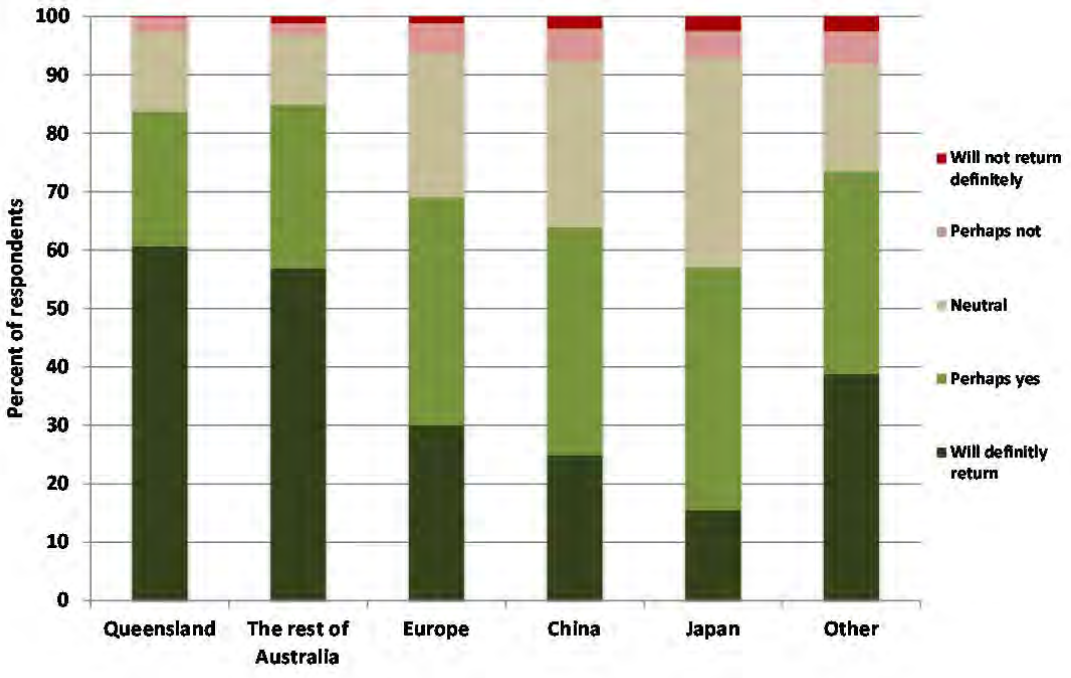

Figure 28: How likely is it that you will return to this region in the future? – by place of origin

The average amount of money each tourist spent while in the regionp was $1129.5 (mean) and $604 (median). Most money was spent on accommodation ($451.8 per person for the entire stay) at cafes, bars or restaurants ($217.5) and on groceries $203.8 (see Figure 29). Average (mean) daily expenditure per person was $141.38. Daily average spending per person on accommodation was $49.05, $27.8 on cafes, bars and restaurants, $24.9 on boating trips excluding fishing charters and $19 daily on groceries (Figure 30).

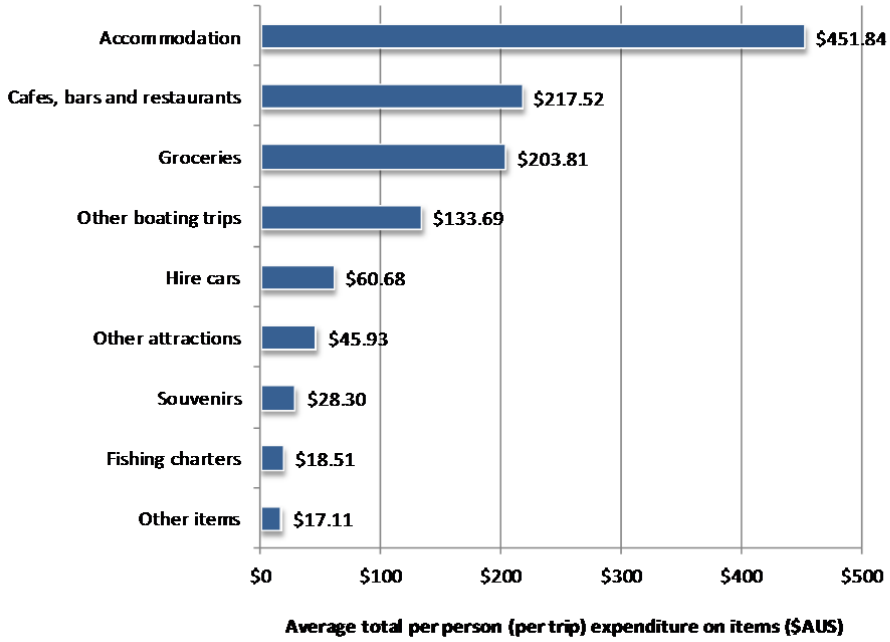

Figure 29: Average (mean) expenditure per person on different types of products – entire time in region

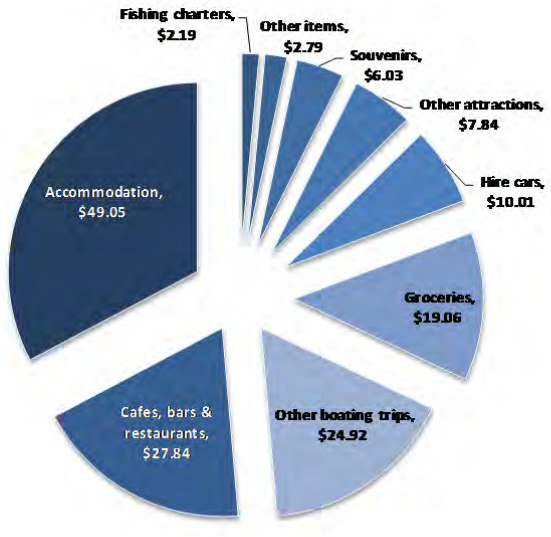

Figure 30: Average (mean) expenditure per person on different types of products – per day

5.4 Resident and Tourist comparisons

5.4.1 Favourite places

The Whitsundays and Airlie Beach were the most frequently named 'favourite places' of residents (Figure 31); Airlie beach was also a 'favourite' of tourists – although Cairns and Port Douglas were mentioned more frequently than the Whitsundays (Figure 32).

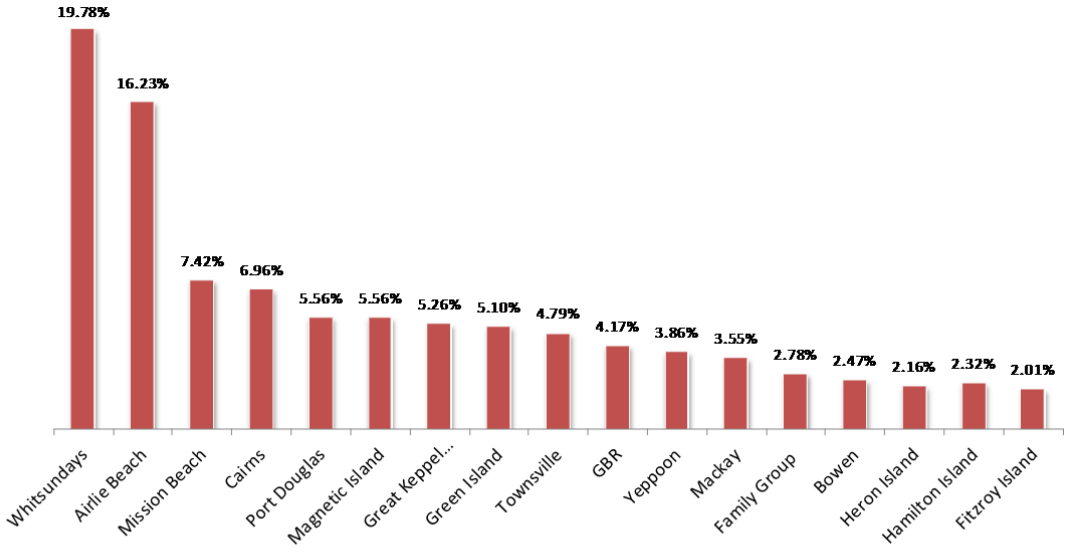

Figure 31: "Favourite" places in the GBRWHA - Residents

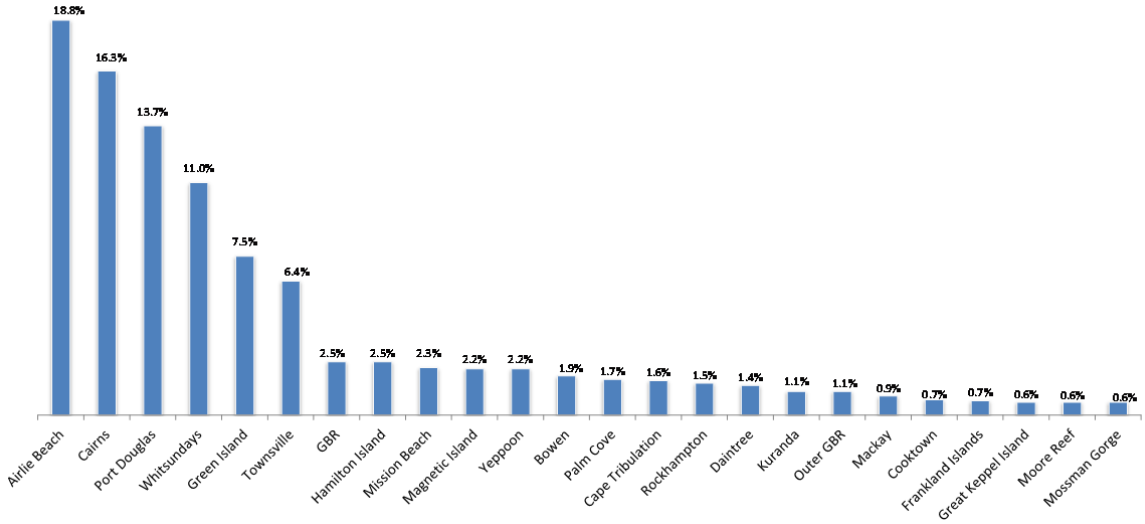

Figure 32: "Favourite" places in the GBRWHA - Tourists

5.4.2 Places people are looking forward to visiting most

Although Cooktown did not get a mention in the list of 'favourites' amongst residents, nearly 15% of all resident respondents said it was the location they were most looking forward to

visiting; 9% of residents said they were looking forward to going to the Whitsundays and the outer GBR (Figure 33). The tourist 'wish list" closely mimicked the tourist favourites list, although interestingly Cooktown also received mention here (Figure 34).

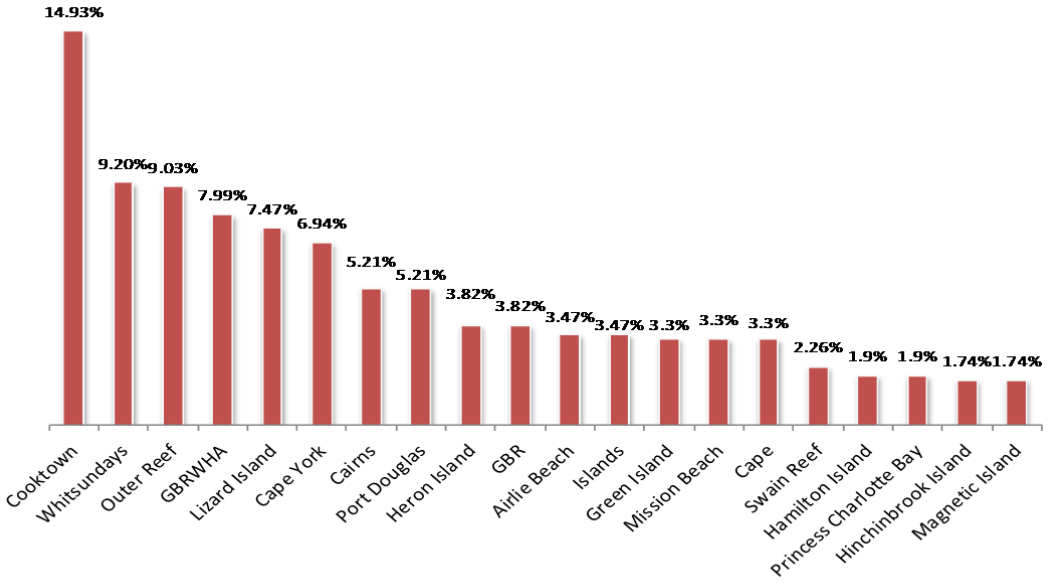

Figure 33: What place are you looking forward to seeing most? - Residents

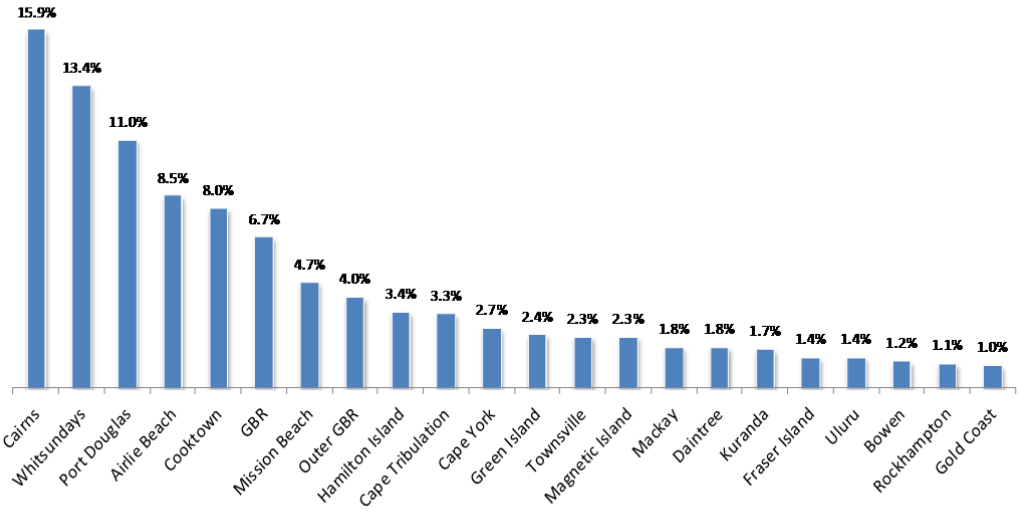

Figure 34: What place are you looking forward to seeing most? - Tourists

5.4.3 Types of GBRWHA-type activities undertaken

The most common activity of residents involved spending time on the beach; the activity engaged in least frequently was sailing (Figure 35). Spending time at the beach was also an

important activity of tourists; although for that group, fishing was the least common activity (Figure 36)

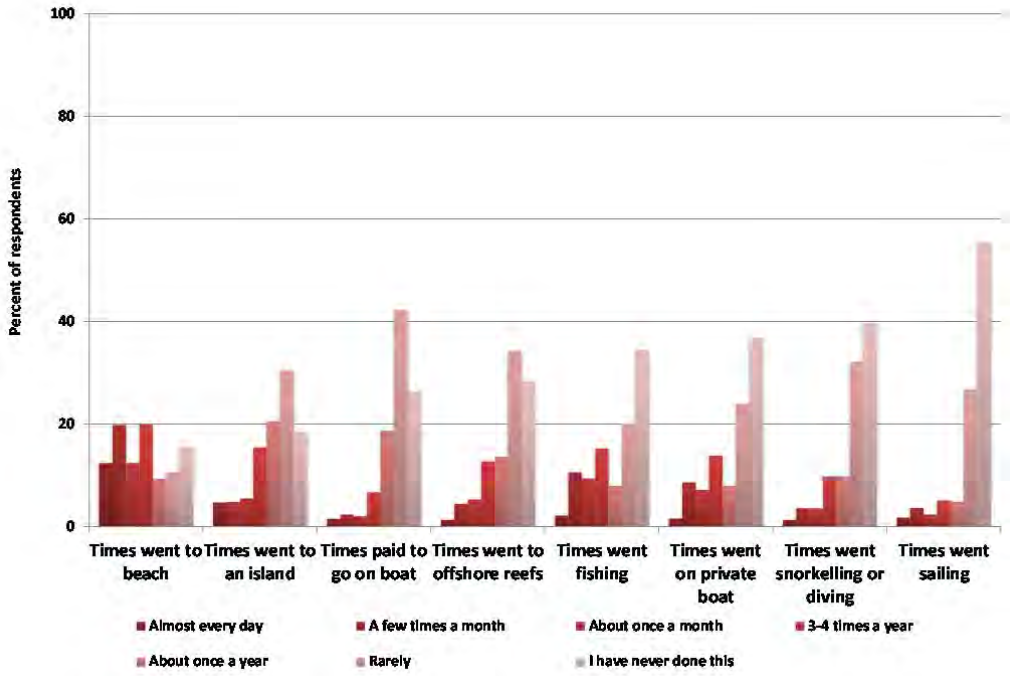

Figure 35: How often do you participate in different activities in the GBRWHA? - Residents

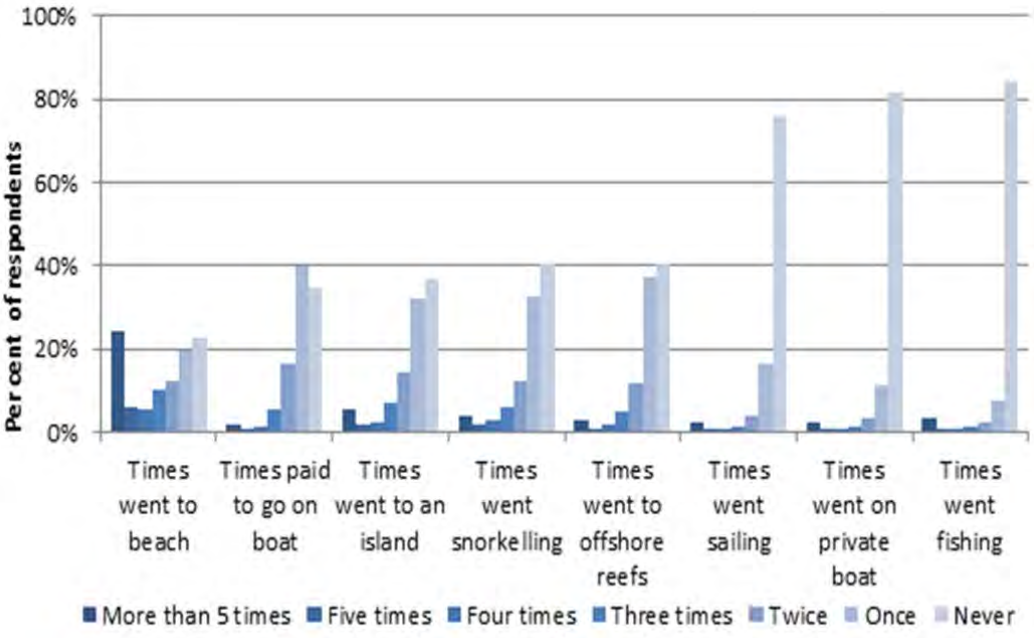

Figure 36: How often do you participate in different activities in the GBRWHA? – Tourists different type of 'resident'

Whilst going to the beach was the most popular activity of both residents and tourists, fishing and boating were the next most popular activities of residents. In contrast, fishing and boating were not popular with tourist; instead going to the islands and off-shore reefs (for snorkelling) were the second most popular activity after the beach (although it is evident they needed to pay for a boat to get there) - Table 8.

Table 8: Per cent of respondents who do particular types of activities more than once a visit/year – Residents and Tourists

Activity	Per cent of residents who do this more than once a year	Per cent of tourists who have done this at least once during their visit
Went to beach	65	77
Went fishing	37	16
Went on private boat	31	19
Went to an island	30	63
Went to offshore reefs	24	60
Went snorkelling	18	60
Went sailing	13	24
Paid to go on boat	13	65

Over 60% of international tourists indicated that they had been snorkelling or diving at least once during their visit, but only around 10% of Queensland visitors and 21% of visitors form the rest of Australia did so. Fishing, going out on a private motor boat/jet-ski and going to the beach were the most popular activities of domestic visitors.

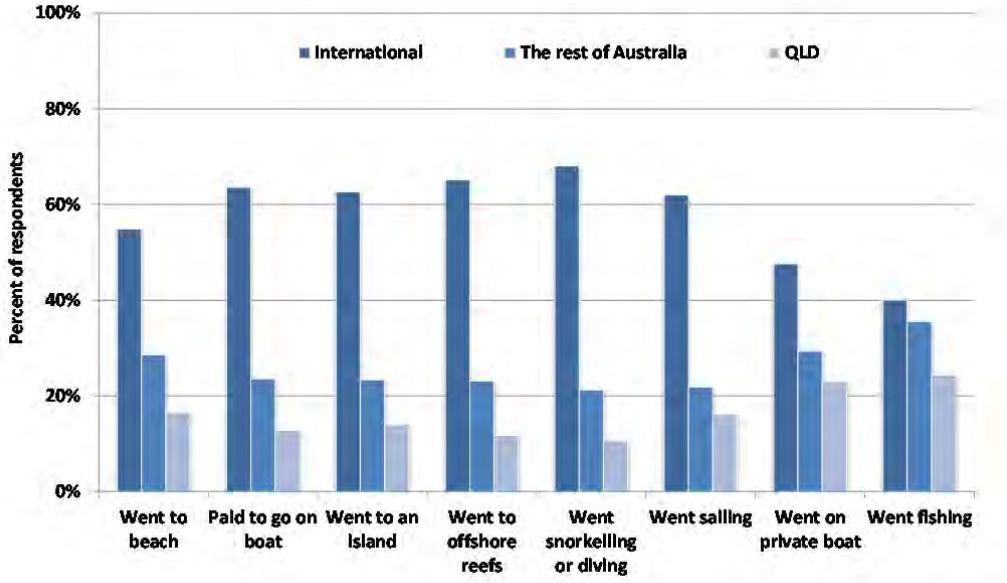

Figure 37: How many different GBRWHA-based activities did respondents participate in? – by type of tourist (From QLD, from elsewhere in Australia, and from Overseas)

5.4.4 Variety of GBRWHA-based activities undertaken

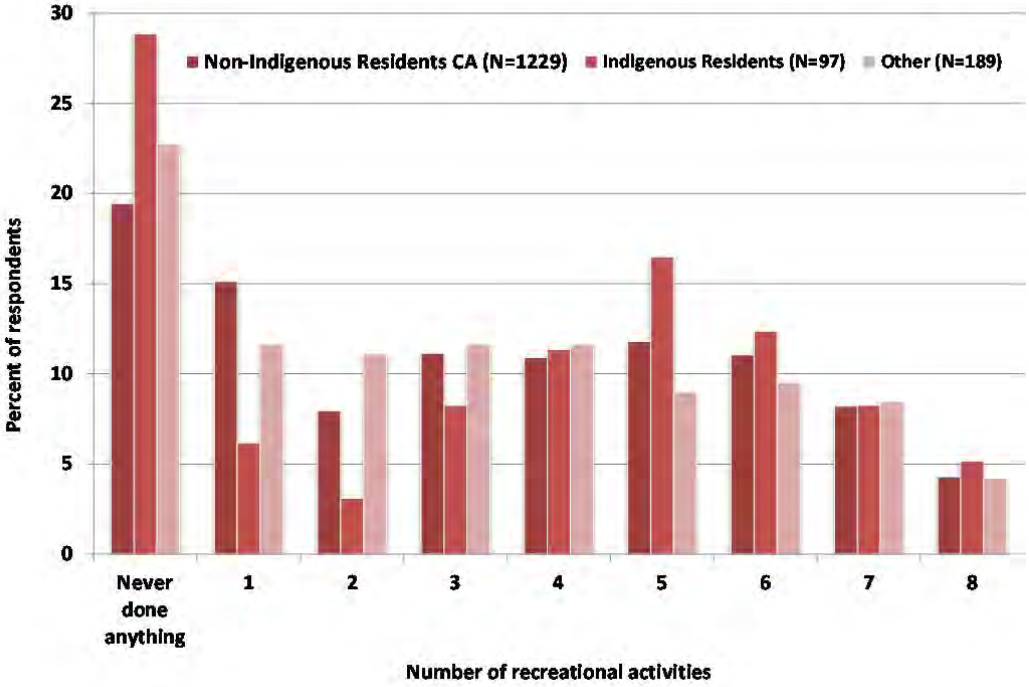

Figure 38: How many different activities did respondents participate in? - – by type of resident (Non-Indigenous, Indigenous, 'Other')

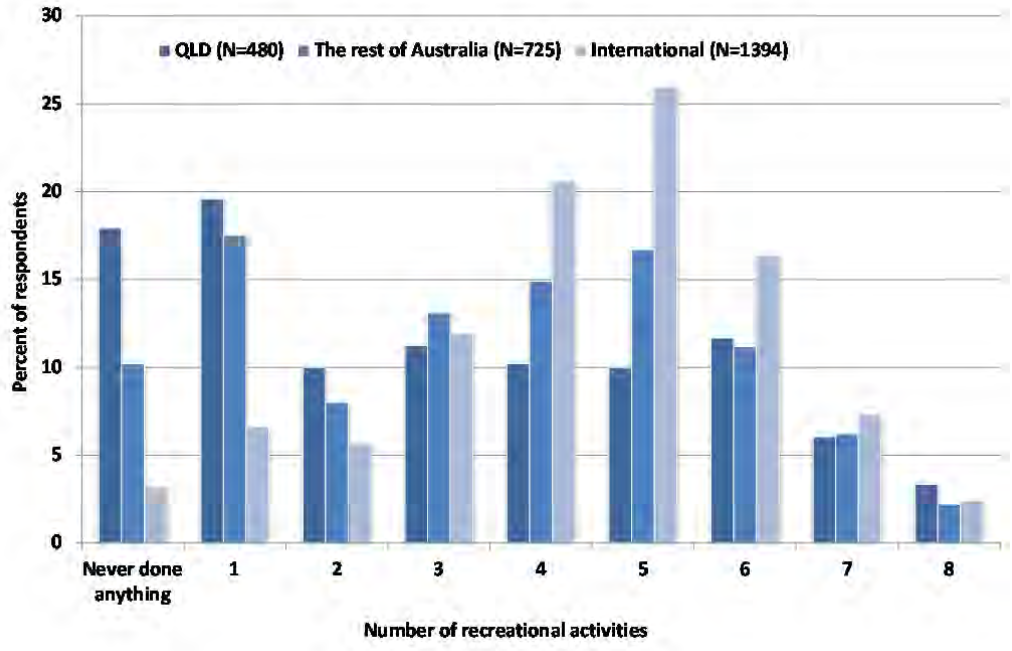

Figure 39: How many different activities did respondents participate in? – by origin of tourist (QLD, elsewhere in Australia, and Overseas)

Just over 20% of the residents who responded to our sample had not done any activity at all in the GBRWHA during the last 12 months (Figure 38). Interestingly, more than 17% of tourists who originated from QLD, and 10% of those originating from elsewhere in Australia did not do any GBRWHA-related activities while in the region; more than 97% of international tourists did something related to the GBRWHA while here (Figure 39).

That said, the majority of resident respondents (65%) had been involved in more than one activity (Figure 38). And there were differences in participation patterns for different groups of residents. The distribution for Indigenous residents is almost bi-modal; more than a quarter had done nothing at all in the GBRWHA within the last 12 months, very few had done just one or two activities; a large proportion had done many different activities (Figure 38). The 'other' group of residents (those who did not provide a postcode, or who were fly-in/fly-out respondents) had lower overall activity levels than Non-Indigenous residents.

Likewise, there were differences between the activities undertaken by different types of tourists: International visitors were much more likely to participate in a large number of different GBRWHA-based activities than were visitors from other parts of Australia, and from Queensland (Figure 39).

5.4.5 The 'importance' of various goods and services – and satisfaction with them

Residents were asked to indicate how important a range of different goods and services were to their overall quality of life (using a five-point likert scale from very unimportant through to very important). Note: these items were presented in a different order on different questionnaires to ensure that we did not create a situation in which items presented at the top of the page were given a consistently higher (or lower) score than those at the bottom.

Environmental factors such as having healthy coral reefs and reef fish, no visible rubbish, iconic marine species, clear ocean water, healthy mangroves and wetlands, were deemed most important (see Figure 40 and Figure 42) – much more so than economic factors (such as the jobs and incomes related to the mining and agricultural, commercial or tourism industries). Respondents were also asked to indicate how satisfied they were with those items; in all but one case, mean satisfaction scores were less than importance scores – particularly for environmental items.

We also asked visitors how important a variety of different things were to them when deciding to come to the area and about how satisfied they were with those things after having come here. Similar to residents, the items that tourists rated as being most important were those relating to the environment – e.g. clarity of water, healthy coral reefs, healthy reef fish and lack of rubbish (see Figure 43). Fishing was important for residents; but unimportant for tourists (reflecting activity data). Here too, satisfaction scores were also generally less than importance scores – although the differences were less marked than they were for residents. In line with resident responses, the clear message here is that many environmental factors are more important 'draw-cards' to the region than market-based factors (e.g. availability of good quality of accommodation, prices that match budget - here termed 'local prices').

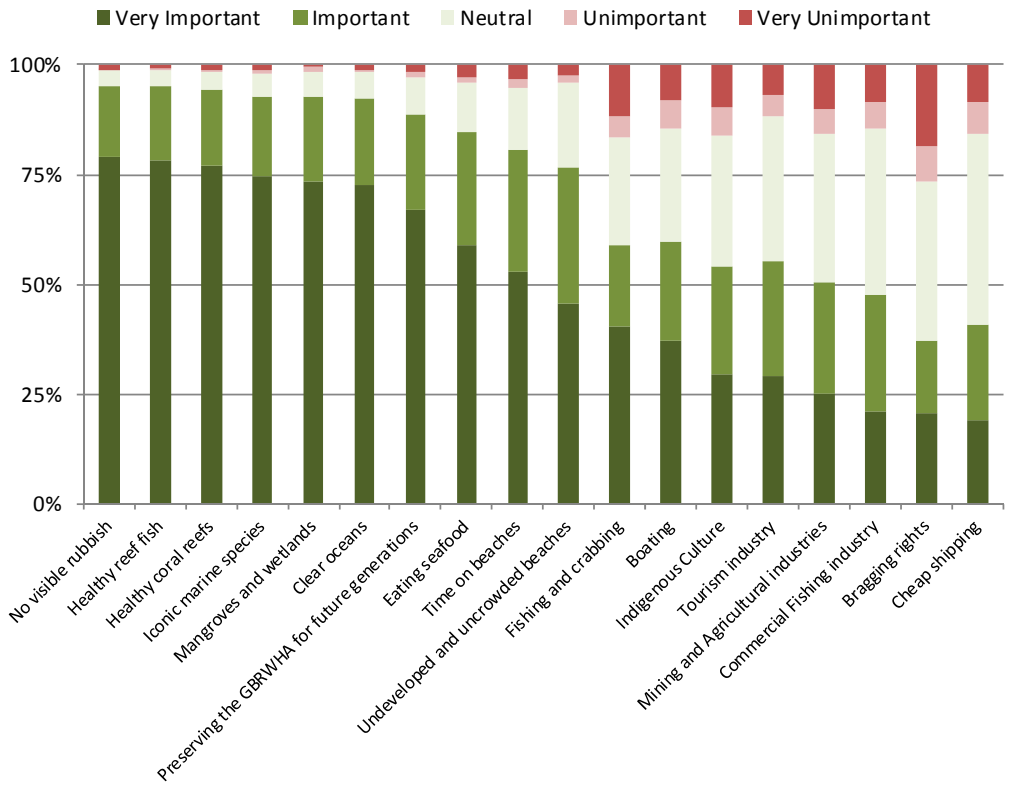

Figure 40: Importance of various ecosystem services to resident quality of life

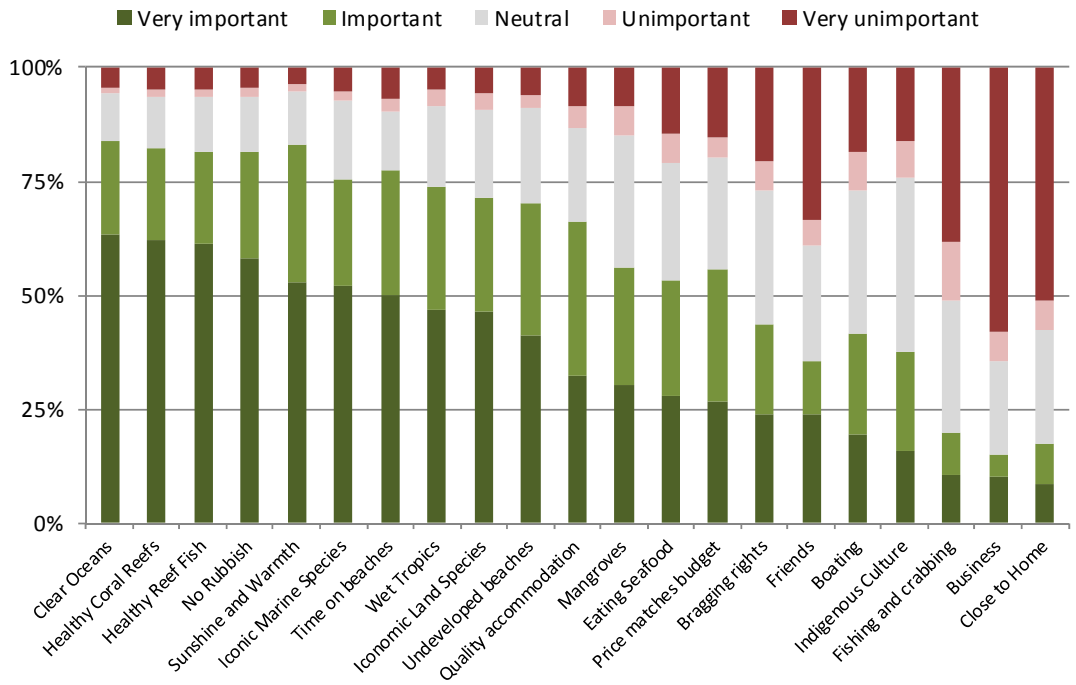

Figure 41: Importance of various ecosystem services as a reason for coming to the region – tourist data

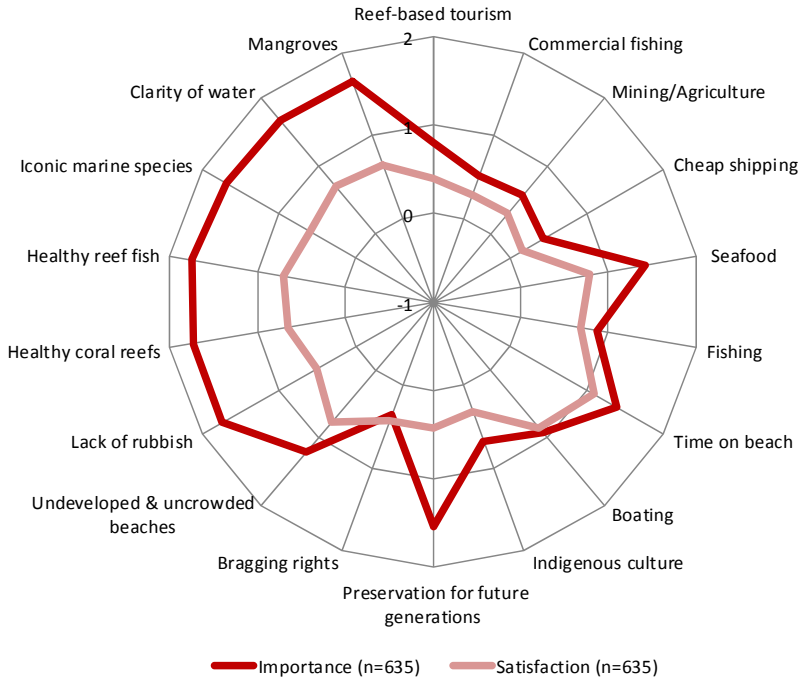

Figure 42: Mean Importance and satisfaction scores - residents

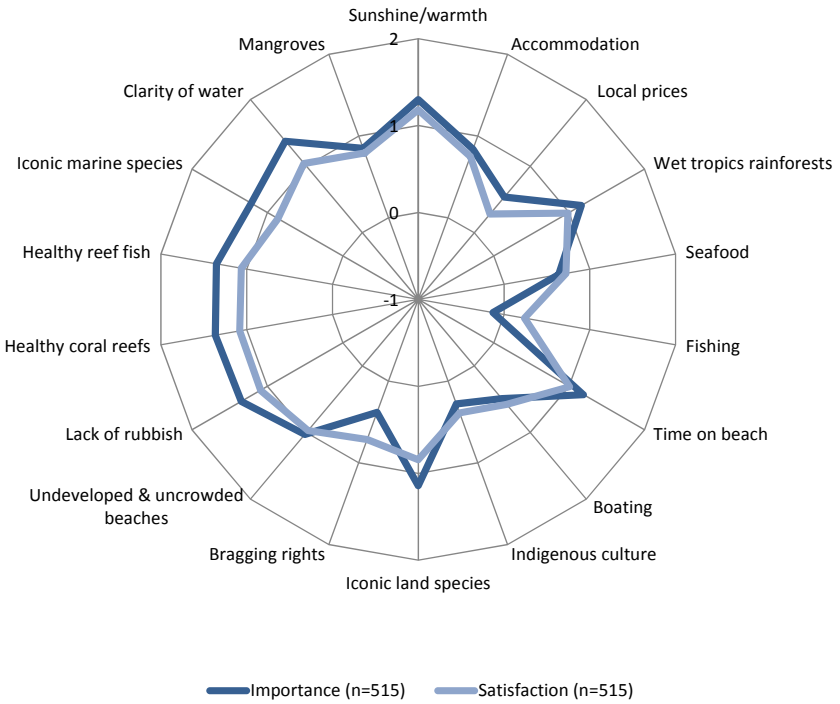

Figure 43: Mean Importance and satisfaction scores - tourists

5.4.6 Stated response to various hypothetical 'changes' to the environment and economy

Both residents and tourists were asked to tell us how they would respond to a series of eight hypothetical 'changes': residents were asked to tell us how the change would affect their overall quality of life, tourists were asked how the change would have affected their overall decision to visit the region.

Responses reinforce the message from the preceding section: environmental factors are important to overall quality of life, and some types of environmental degradation would have a stronger adverse impact on overall quality of life than a 20% increase in prices (compared to elsewhere in Australia) – see Figure 44. Indeed more than 80%of residents stated that they would be much less satisfied if there were twice as many oil spills, 79% said they would be much less satisfied if there was twice as much rubbish on beaches and islands, and 75% of respondents were strongly averse to reductions in water clarity. Interestingly, more than 50% of respondents said they would either be less satisfied, or much less satisfied if there were twice as many tourists.

Similarly for tourists: it seems that the worst thing that could happen is having oil spills – with 48% of respondents saying that they would not come at all in this situation – see Figure 45. The next biggest "turn off" was water clarity (37%), followed closely by rubbish on the beaches and islands (35%). Just over 20% indicated that they would not come to the area if there was half as much live coral. Nearly 18% of participants said that they would not come to the area if local prices rise by 20% compared to other places in Australia. People did not seem to be all that bothered by the prospect of having less chance of catching fish (8%).

We also used responses to the question related to Figure 45 to estimate the mean reduction in total visitor nights that would occur if tourists actually behaved as they claim they will in response to the hypothetical 'changes' (no change suggests 0% reduction, would not have come at all suggests a 100% reduction). Figure 46 shows mean values for different visitors of different origins. Evidently, International visitors and those from outside Queensland are more responsive to environmental degradation than tourists from within Queensland; the 'local' tourists are, instead somewhat more responsive to the prospect of reduced fish catches than those from further away.

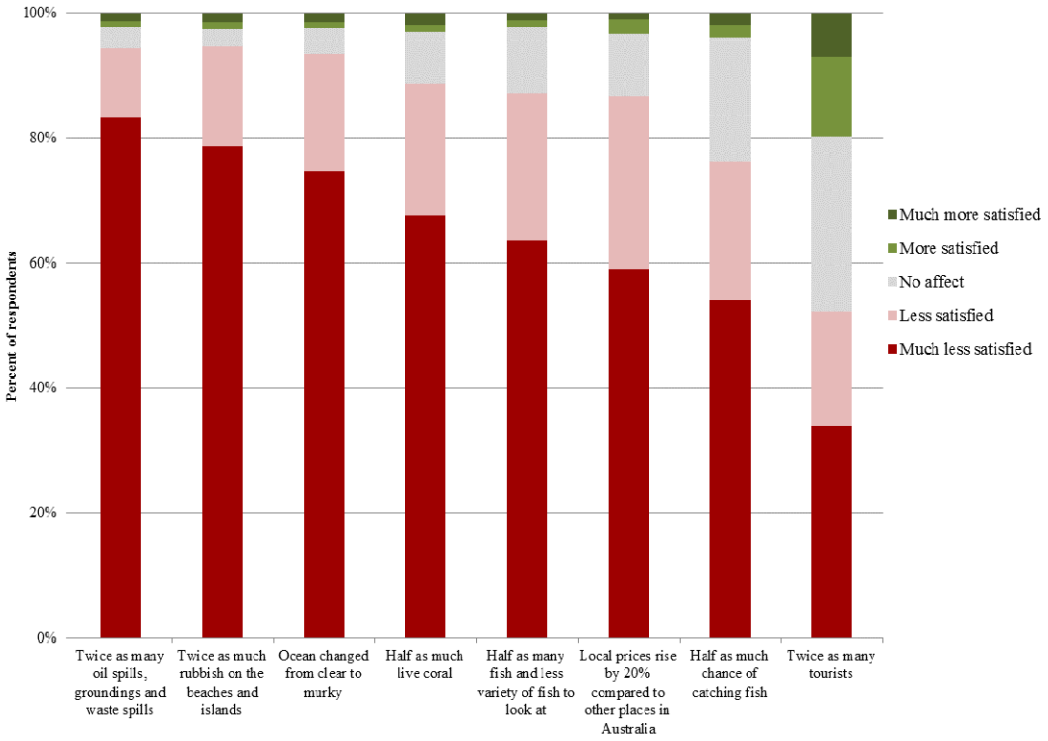

Figure 44: Stated response to hypothetical changes in the GBRWHA – Residents

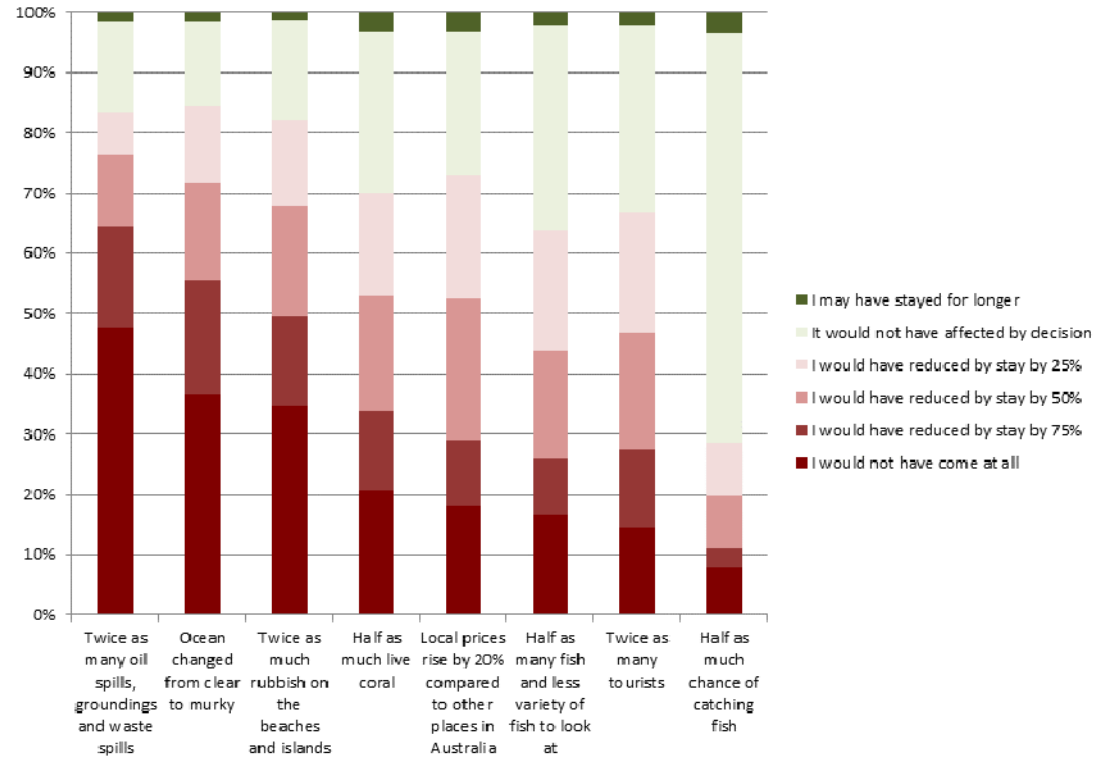

Figure 45: Stated response to hypothetical changes in the GBRWHA - Tourists

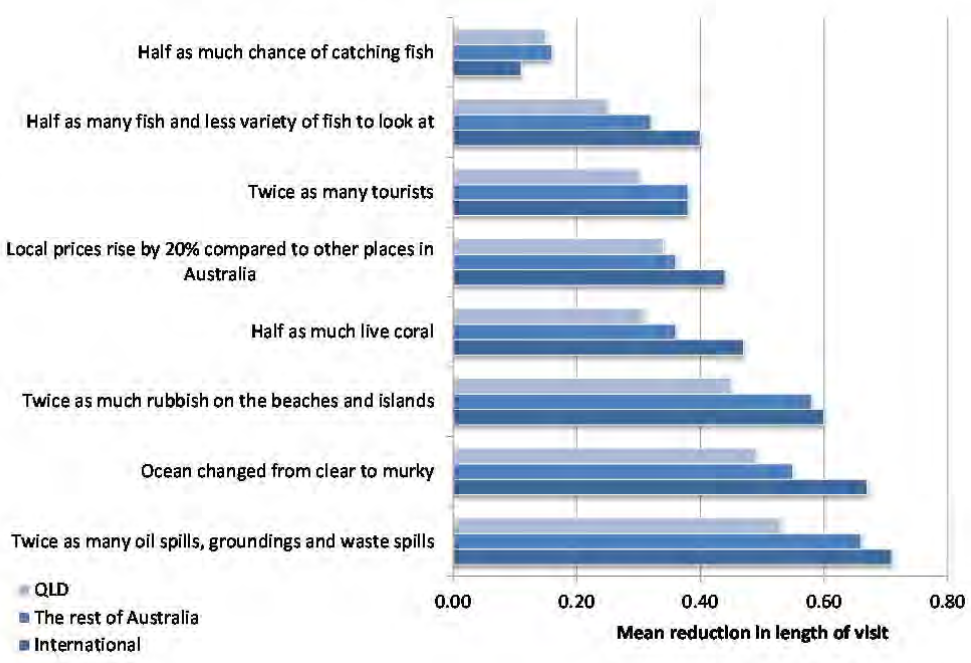

Figure 46: Average (stated) percentage reduction in length of stay in response to different hypothetical changes by origin of tourist

5.4.7 WTP for 'improvements'

Both residents and tourists were asked to indicate how much they would be willing to pay (WTP) to help 'fix' various threats to the reef (via a fund set up to help solve these problems).

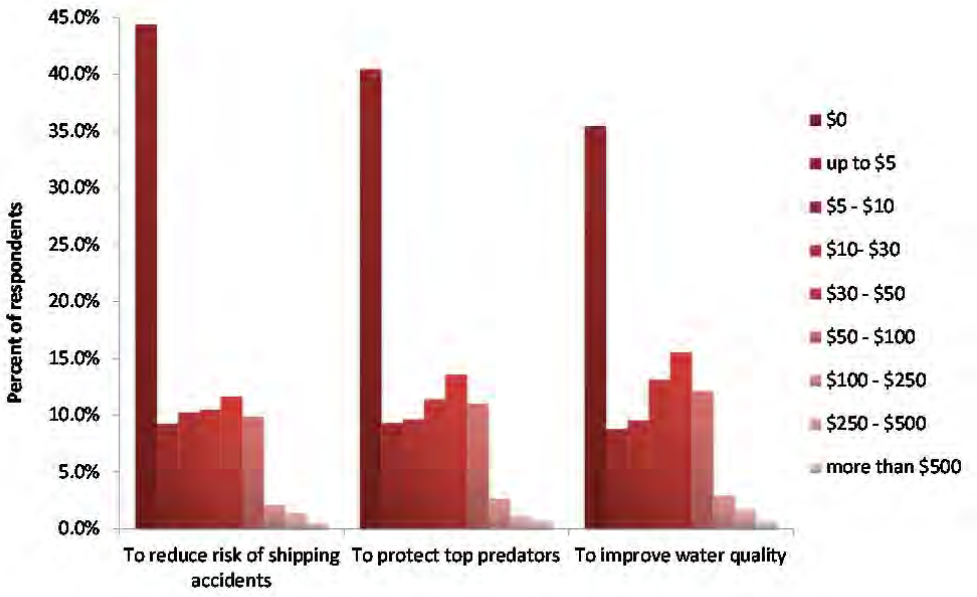

Figure 47: Resident willingness to pay to help fix various threats to the GBRWHA

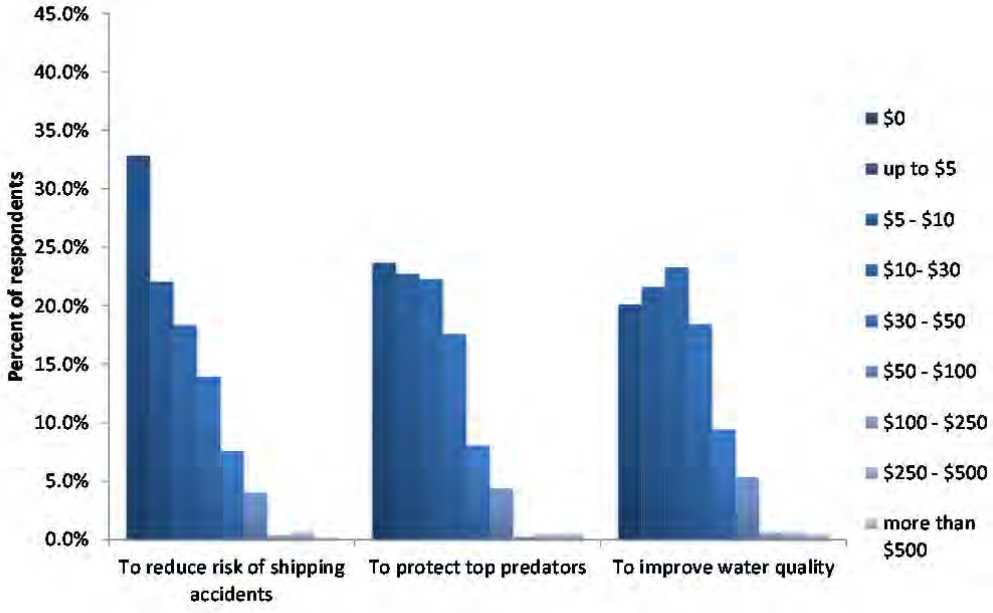

Figure 48: Tourist willingness to pay to help fix various threats to the GBRWHA

Despite the fact that so many residents indicated that various environmental goods and services were important to their overall quality of life, nearly 45% of respondents were not willing to contribute any money at all to these 'funds' (see Figure 47). A larger percentage of tourists were willing to make such a contribution (Figure 48) – although the tourist

contributions were couched as '$ per visit" rather than $ per annum so the amounts are not directly comparable.

Despite the very large number of residents who said they would not be WTP anything, the average amount which residents were WTP per annum was nearly twice that of the amount tourists were WTP per trip. Both residents and tourists were willing to pay most for water quality improvements ($45.98 and $26.58 respectively). Mean WTP to protect top predators and to reduce risk of shipping accidents was a bit lower (Figure 49).

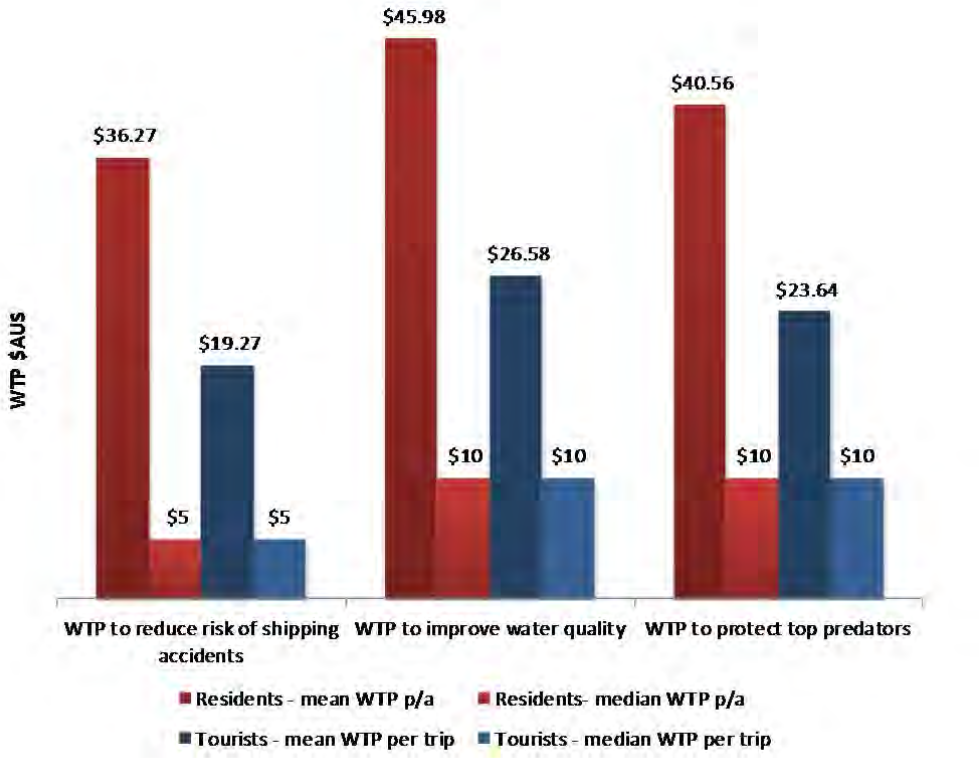

Figure 49: Mean and Median WTP – residents and tourists

5.4.8 Attitudes towards preservation of the GBRWHA

We examined the level of agreement to several statements about who should be responsible for preserving the GBRWHA (see Figure 50 and Figure 51). We found that most people (residents and tourists) disagreed with the statement "only people who live near or visit the GBRWHA have a responsibility to care for it" and most agreed with the statement that "I am not prepared to pay unless people throughout Australia pay too" (similar pattern for the following two statements). Evidently, respondents care about the GBRWHA, but do not want to be the only person who 'pays' to protect it. There is a feeling of collective responsibility.

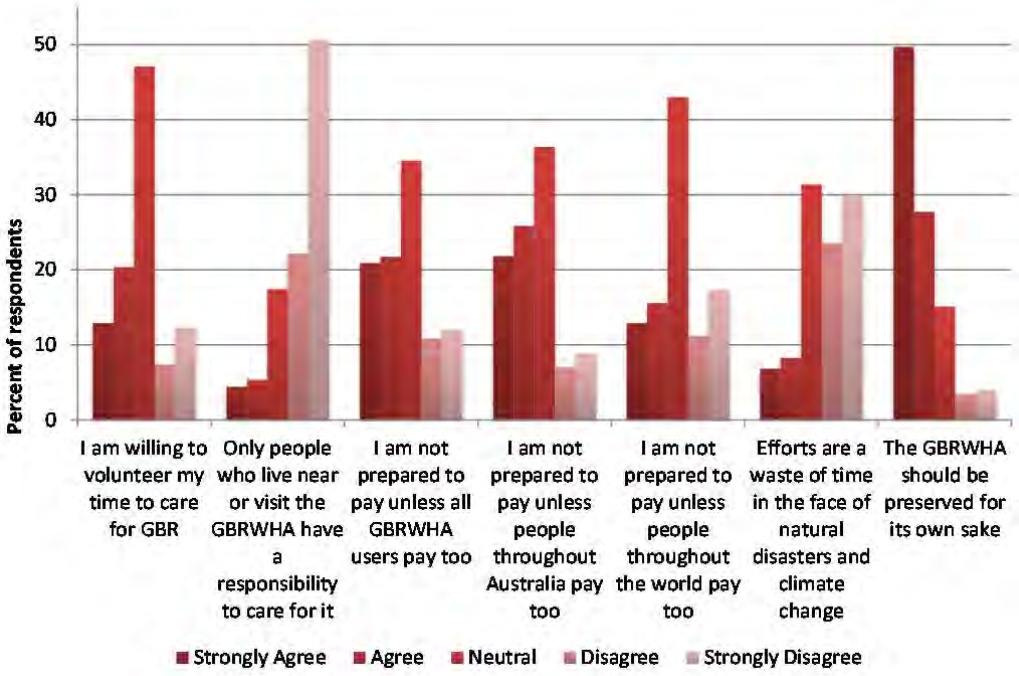

Figure 50: Attitudes towards preservation of the GBRWHA – residents

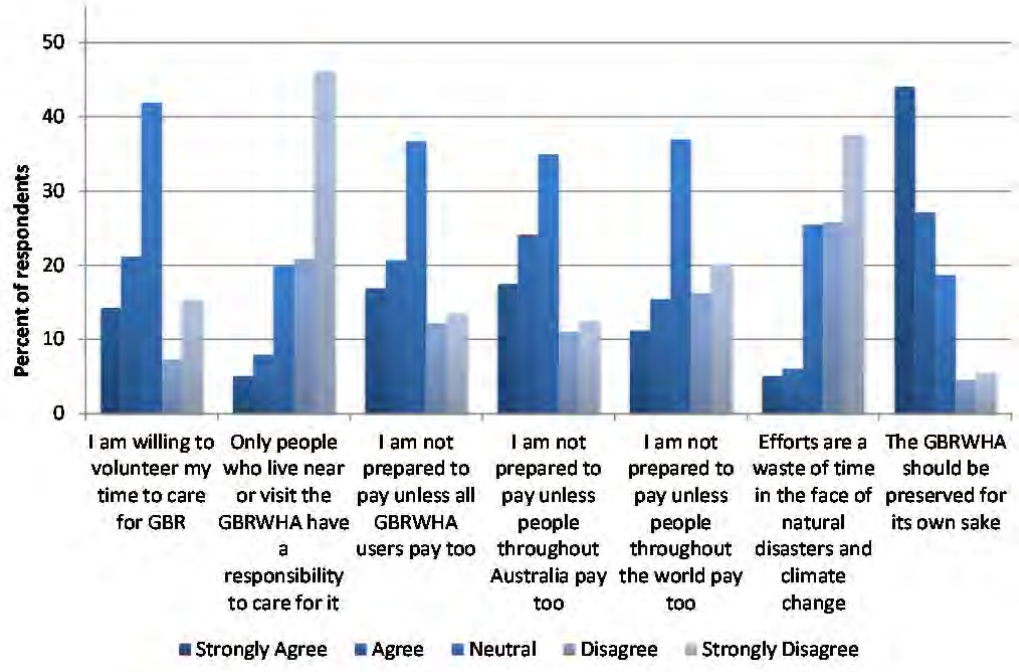

Figure 51: Attitudes towards preservation of the GBRWHA - tourists

5.5 Japanese Visitors – special focus

5.5.1 Demographic summary

Overall, 243 Japanese tourists answered the survey, most of which (240) were collected in Cairns region. The information in this section relates to those people. 56.1% were females. Most people (76.3%) who answered the survey were between 20 to 40 years old (Figure 50), and about a third were travelling as a couple (34.7%) and close to 30% were travelling as friends (Figure 51).

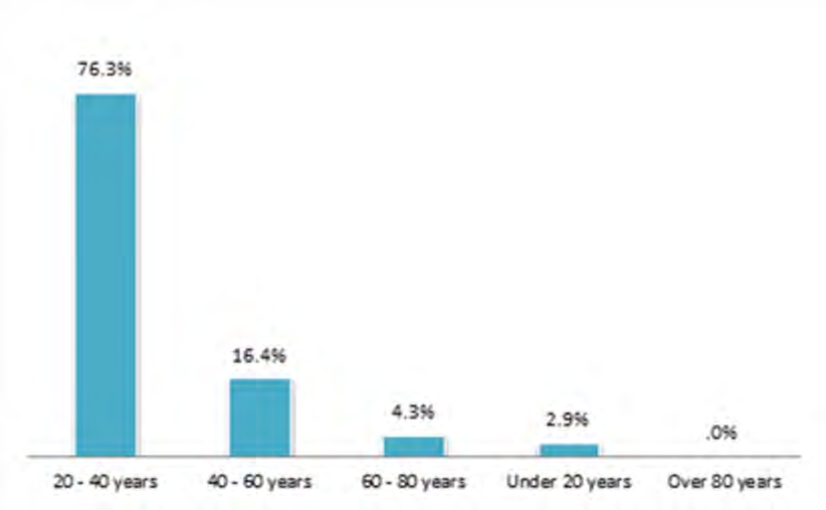

Figure 52: Age groups of Japanese respondents

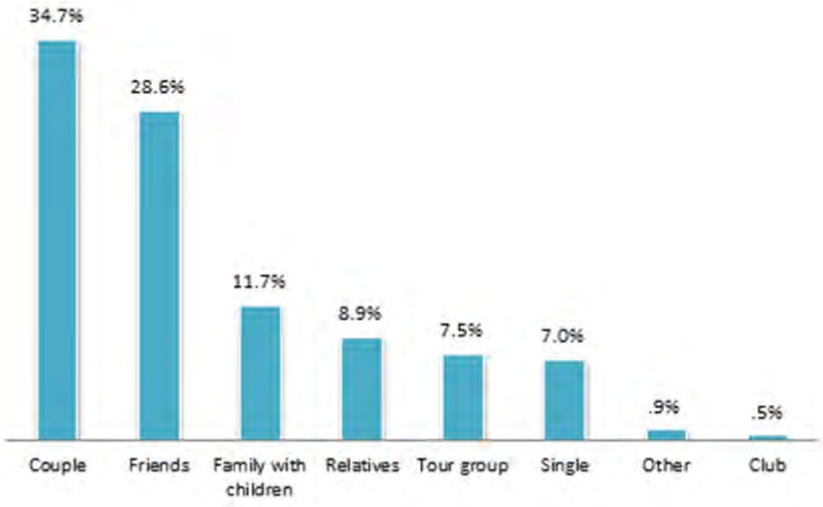

Figure 53: Japanese respondents' travel parties

Most (73.7%) had gone to university (Figure 52), and about 20% were employed in the government sector (including education and health) and manufacturing, mining and ports sector (Figure 53).

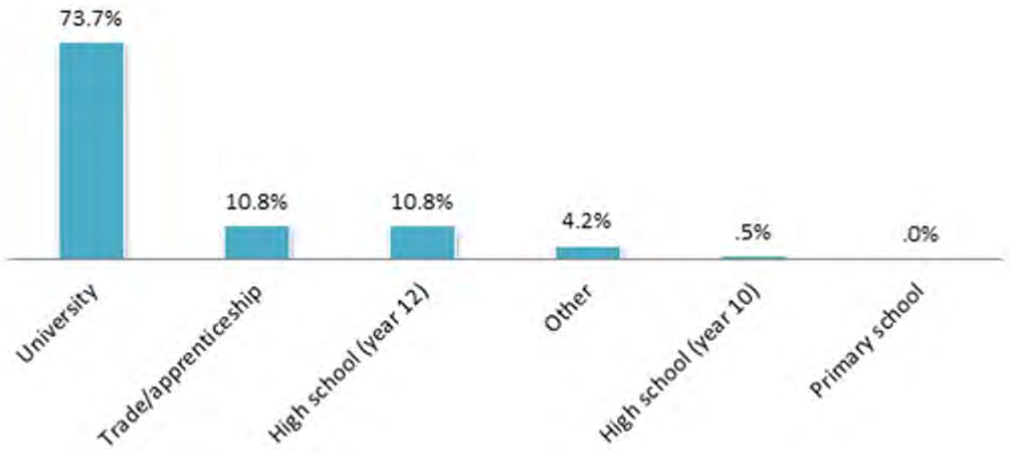

Figure 54: Highest educational qualification of Japanese respondents

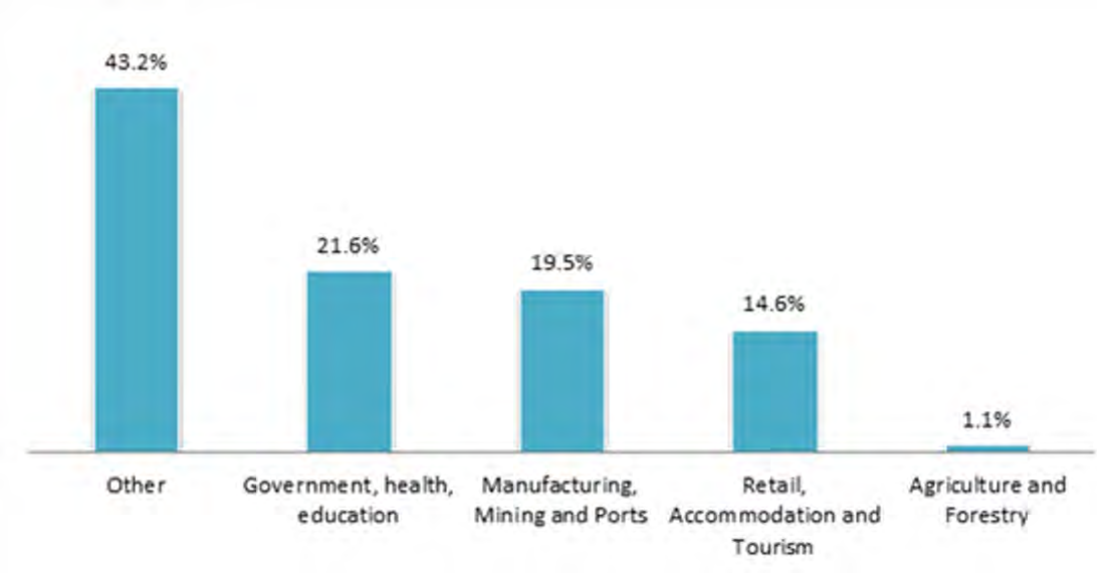

Figure 55: Main income source of Japanese respondents

The most common income categories were between $40,000 and $100,000 (Figure 54).

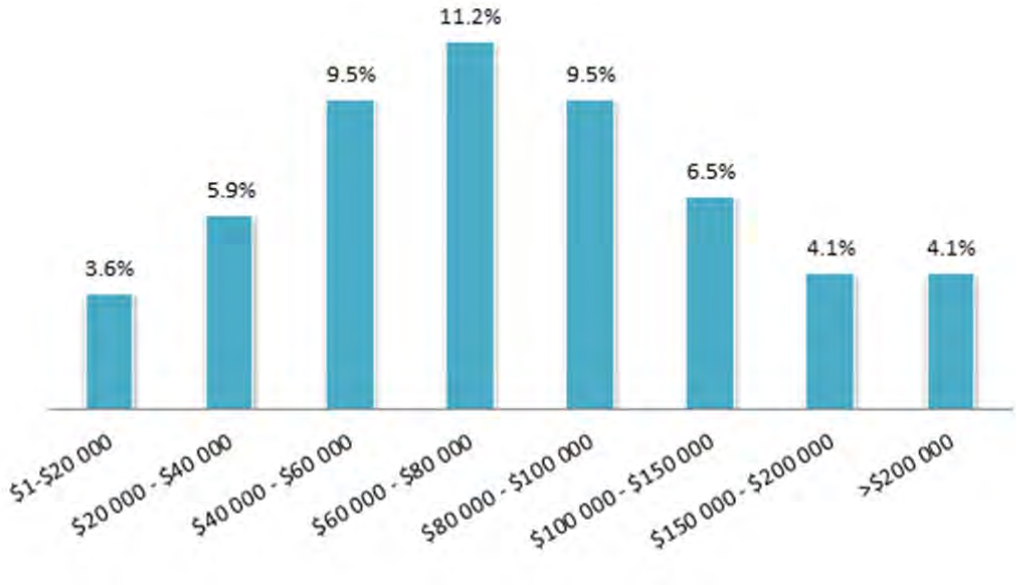

Figure 56: Japanese respondents' income

5.5.2 Where did they go and what did they do?

5.5.2.1 Previous visits and length of stay

Most people had never visited the GBRWHA previously (Figure 55). Some were planning to stay in the region for a very long time (the maximum was 90 nights), but most (median) stayed for 4.19 days.

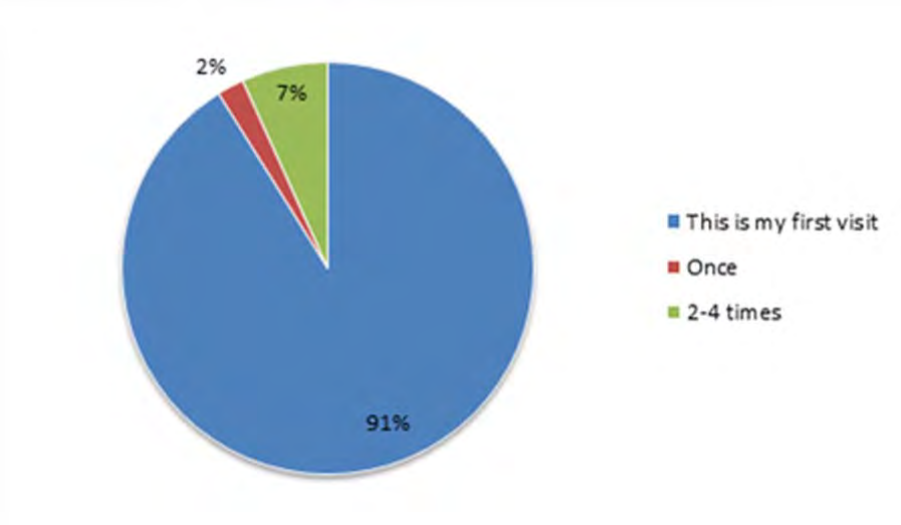

Figure 57: How many times have you been to this region before? – Japanese respondents

5.5.2.2 *Favourite areas visited*

For about a fourth of Japanese tourists Green Island was the most favourite place they visited.

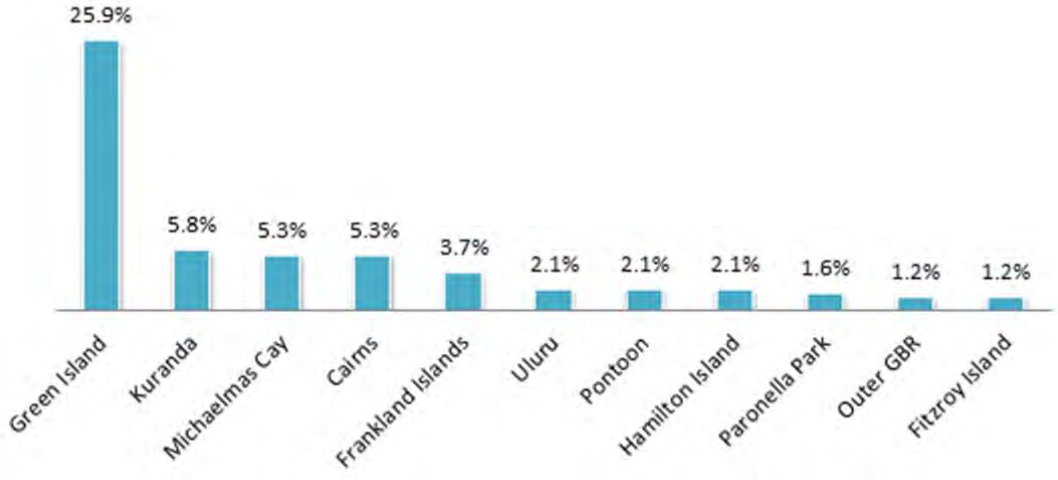

Figure 58: "Favourite" places in the GBRWHA visited by Japanese Respondents

5.5.2.3 *Activities within GBRWHA*

Most people went on a paid boat trip (76.2%) with an average (mean) of 0.9 times, while very few went sailing, fishing or spent time on a private boat. More than two-thirds spent time on the islands (70.6%), went on a paid boat (70.6%) or spent time snorkelling/diving (69.3%).

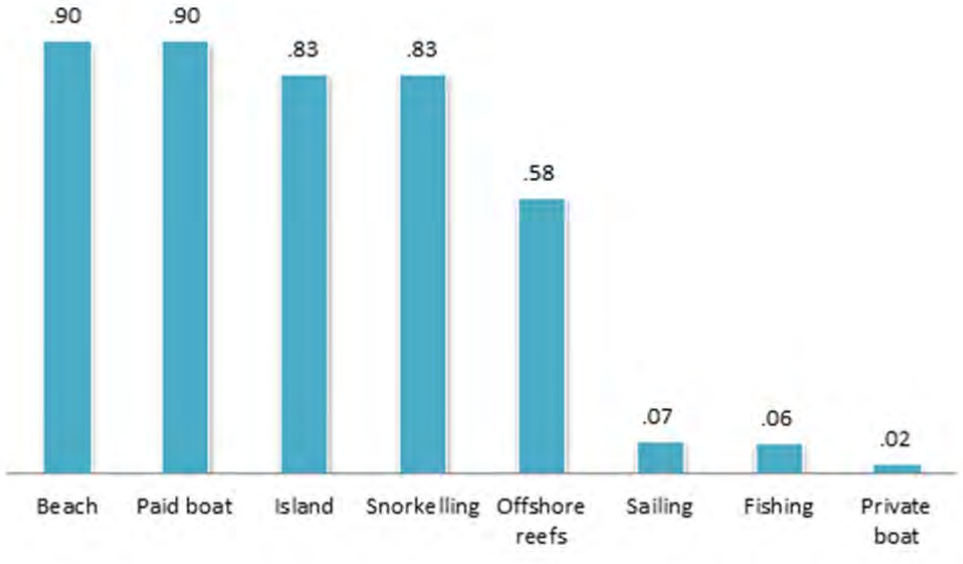

Figure 59: Average (mean) number of times respondents did different activities on this trip within the GBRWHA

5.5.3 What encouraged them to come to the region and were they happy with what they found?

Clarity of water, iconic land species, healthy reefs, healthy fish, Wet Tropic rainforests, spending time on the beach, swimming and diving were the most important factors that encouraged Japanese tourists to visit the region (Figure 58). Similarly the highest levels of satisfaction related to the reefs, iconic land species, Wet Tropics rainforest, and clarity of water.

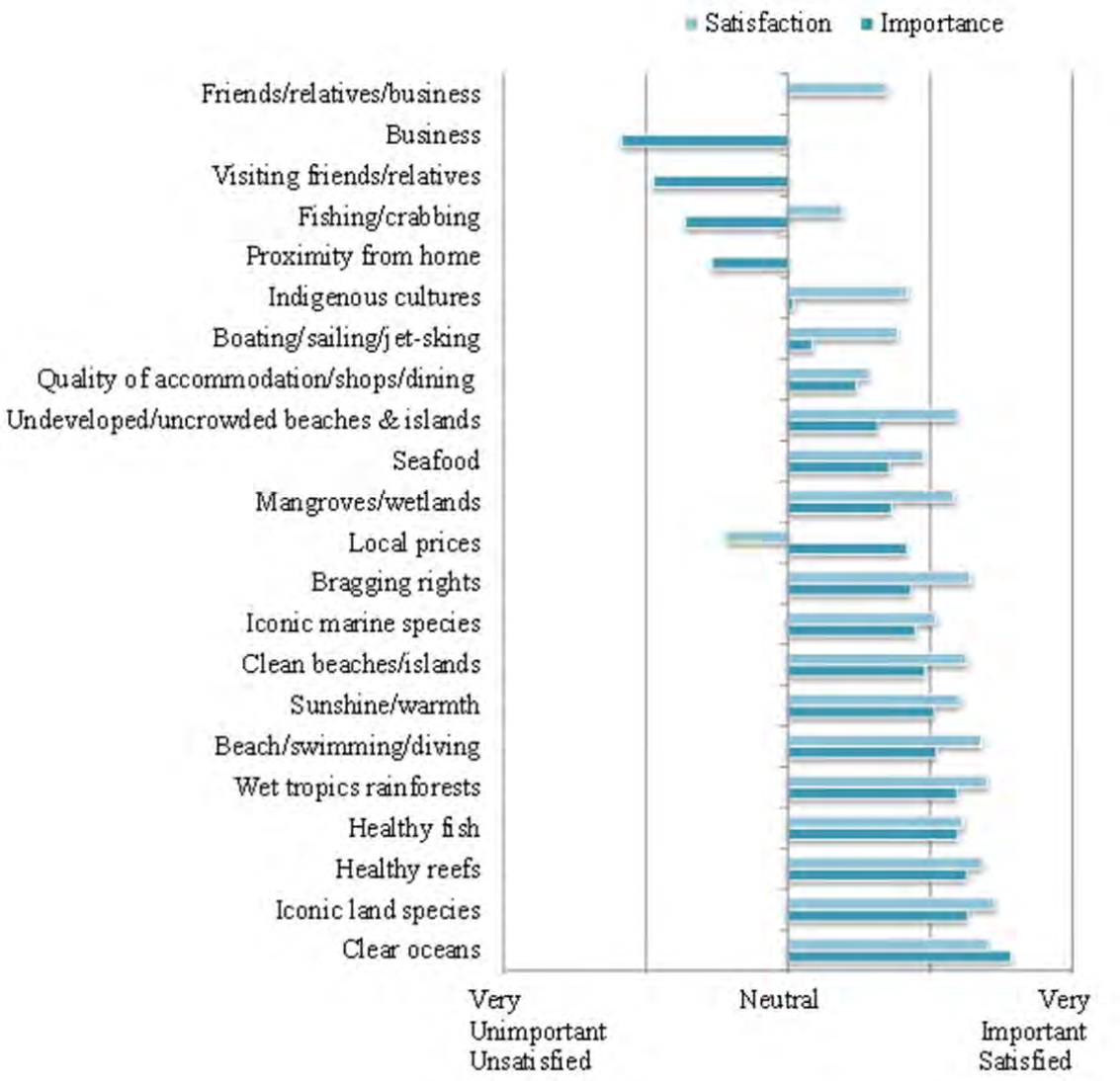

Figure 60: Importance and satisfaction – Japanese respondents

5.5.4 What sorts of things would make these visitors decide not to come here?

Figure 59 below shows the reaction of respondents to hypothetical changes to the GBRWHA. More than half of people felt that they would not have visited the area at all if there was twice as many oil spills, ship groundings and waste spills (66%), if the water changed from clear to murky (57%) and if there was twice as much rubbish on beaches and islands (53%). About a third of them indicated that they would not come to the area at all if there was half as much live coral (37%), if the price rose by 20% (35%), and if there was half as many fish and less variety to look at (34%). People did not seem to be all that bothered by the prospect of having less chance of catching fish and/or to the idea of more tourists. This could be due to the fact that very few respondents went fishing and boating on their trip to the GBRWHA.

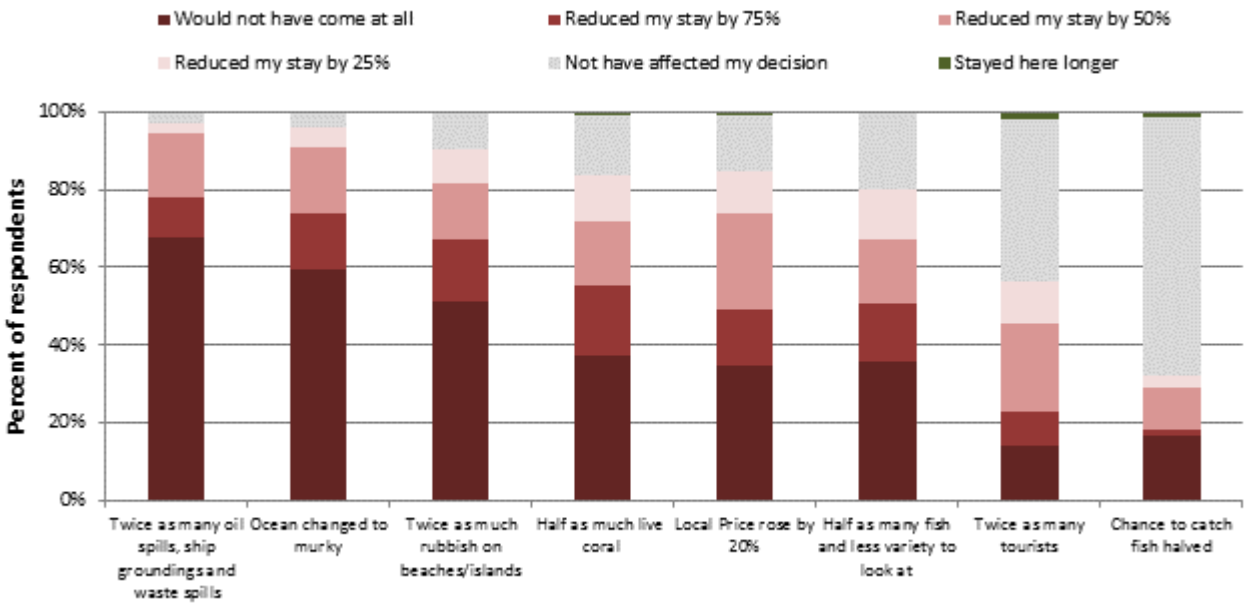

Figure 61: Japanese respondents' reaction to hypothetical changes in the GBRWHA

5.6 Chinese visitors – special focus

5.6.1 Demographic summary

In total, 225 Chinese tourists answered the survey, most of which (216) were collected in Cairns region. The information on this sheet relates to those people. 57.1% were females.

More than half of people (57.8%) who answered the survey were between 20 to 40 years old (Figure 60), and close to a third were travelling as a tour group (30.1%) and about a fifth were travelling as family with children (Figure 61).

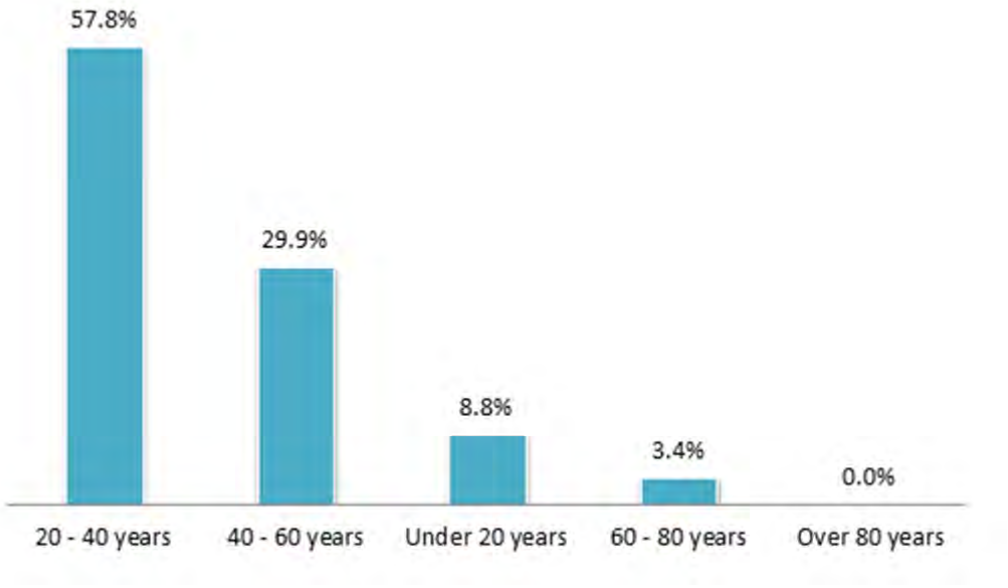

Figure 62: Age groups of Chinese respondents

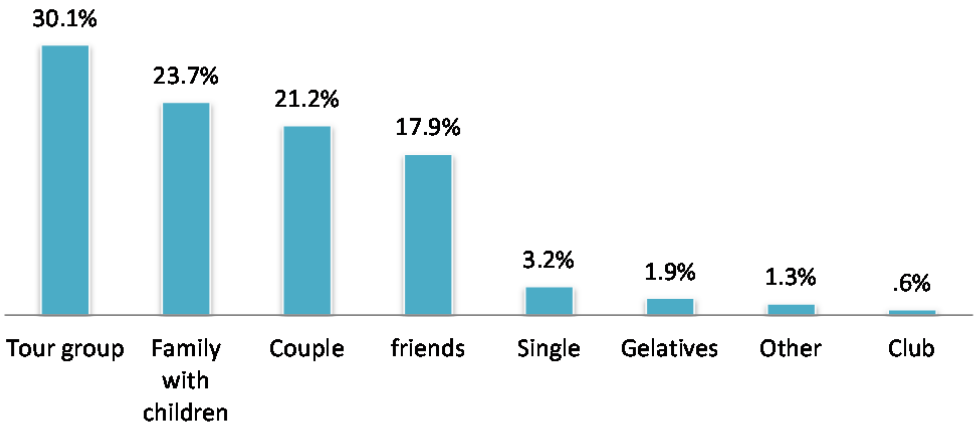

Figure 63: Chinese respondents' preferred travel parties

Most (80.9%) had gone to university (Figure 62), and about 27.1% were employed in the government sector including education and health (Figure 63).

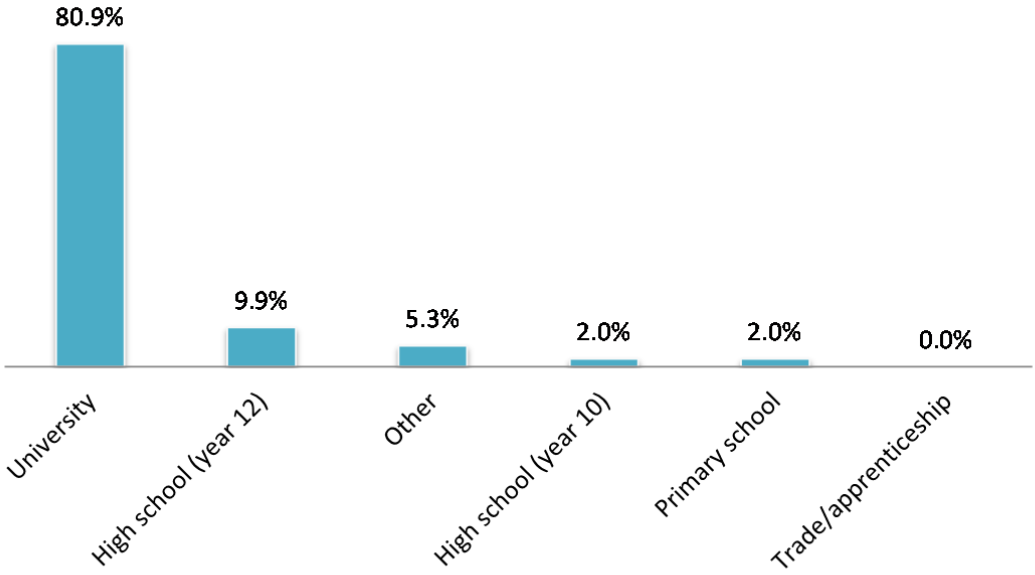

Figure 64: Highest education of Chinese respondents

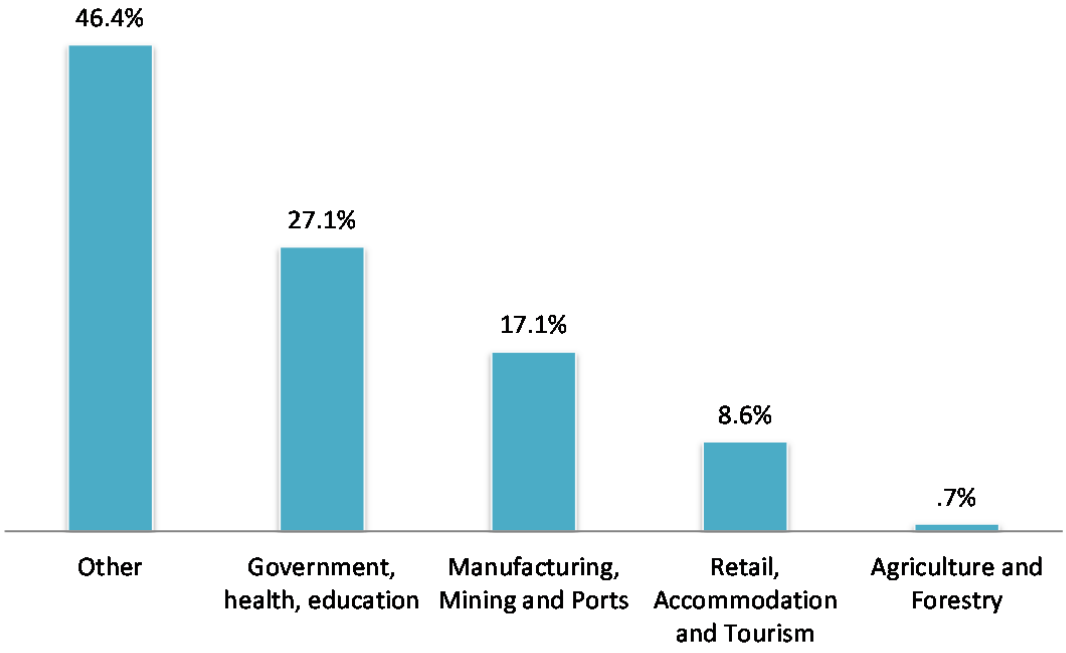

Figure 65: Main income source of Chinese respondents

Many (30.9%) reported to earn less than $20,000 a year (Figure 64).

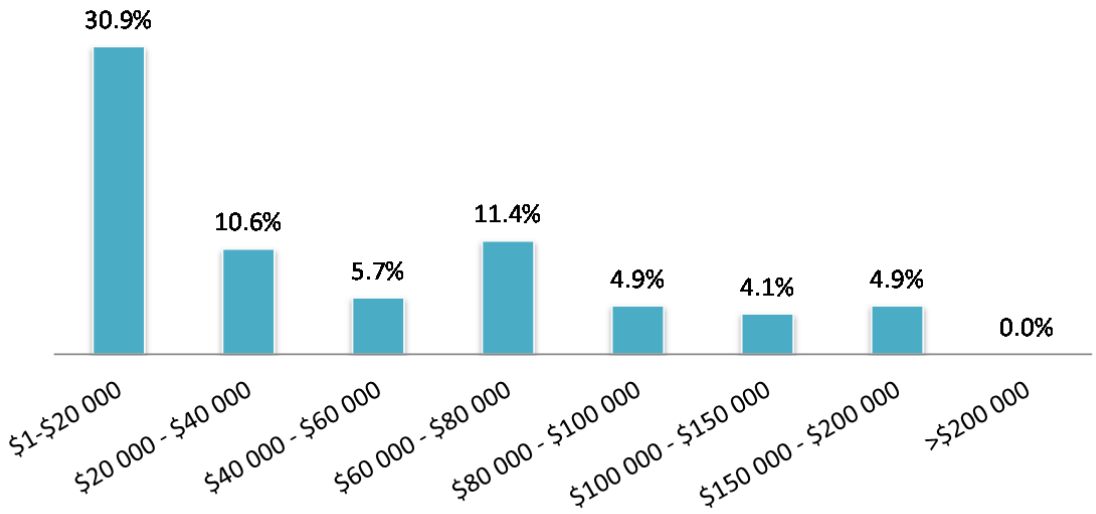

Figure 66: Chinese respondents' amount of income

5.6.2 Where do people go and what do they do?

5.6.2.1 Previous visits and length of stay

For most people it was their first visit to the GBRWHA (Figure 65). Some were planning to stay in the region for a week (the maximum was 7 nights), but most (median) stayed for just 2 nights.

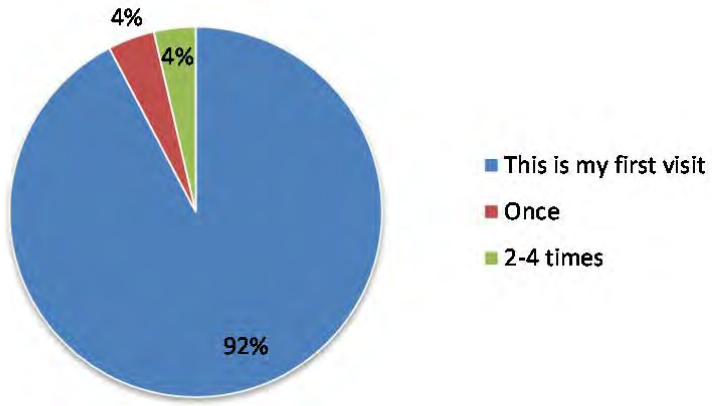

Figure 67: Frequency of visitation to the GBRWHA

5.6.2.2 Favourite areas visited

Green Island (17.8%) and Cairns (9.3%) were most often nominated as the 'favourite place' visited (Figure 66).

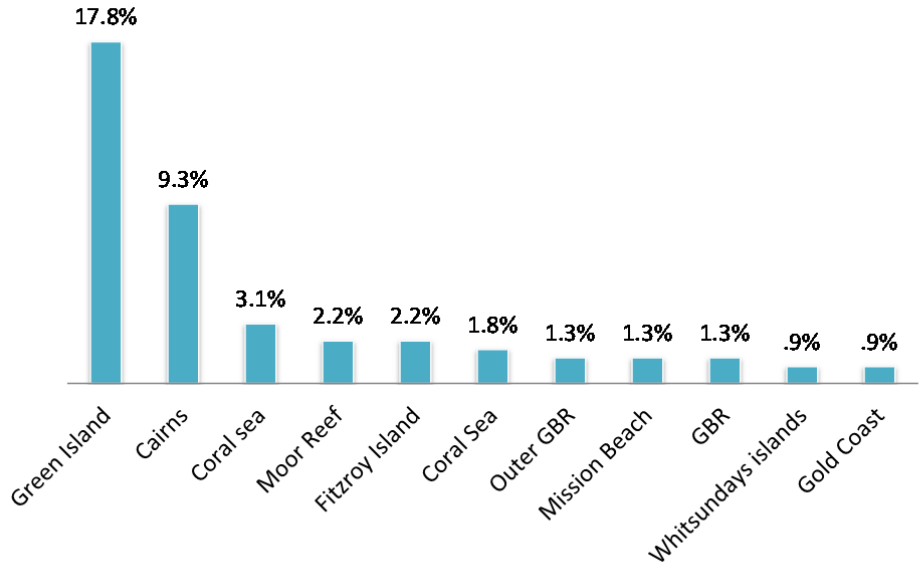

Figure 68: "Favourite" places in the GBRWHA – Chinese visitors

5.6.2.3 Activities within GBRWHA

Most people spent time on the beach (83.9%) with an average (mean) of 1.86 times. Many people also went to offshore reefs (77.9%), went to an island (77.9%) or went snorkeling/diving (66.4%%) while very few went on a private boat (23.5%), fishing (18.4%), or sailing (12.9%).

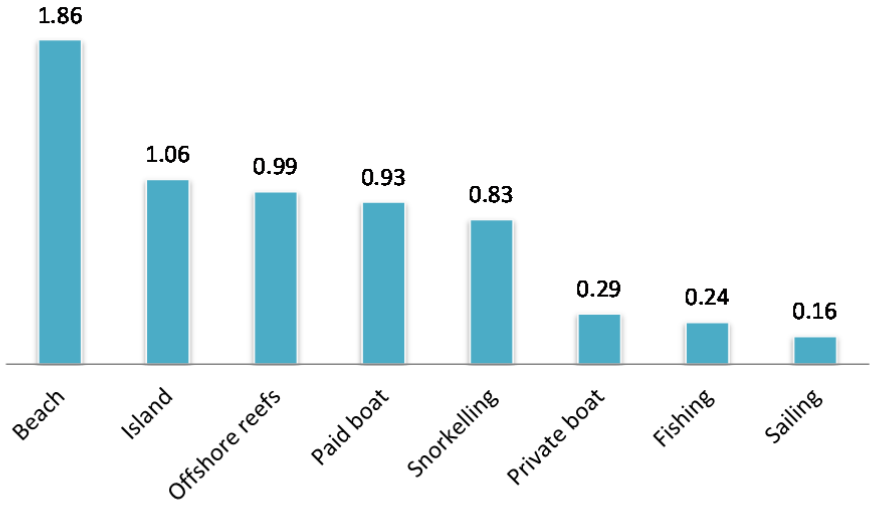

Figure 69: Average (mean) number of times Chinese respondents did different activities on this trip within the GBRWHA

5.6.3 What encouraged them to come here and were they happy with what they found?

Clarity of water, clean beaches, healthy reefs, healthy fish, spending time on the beach swimming and diving, iconic land species and iconic marine species were the most important factors that encouraged Chinese tourists to visit the region (Figure 68). Similarly the highest levels of satisfaction related to the marine-based activities and attractions. Satisfaction rates of these aspects that had high importance were generally lower than that of importance rates.

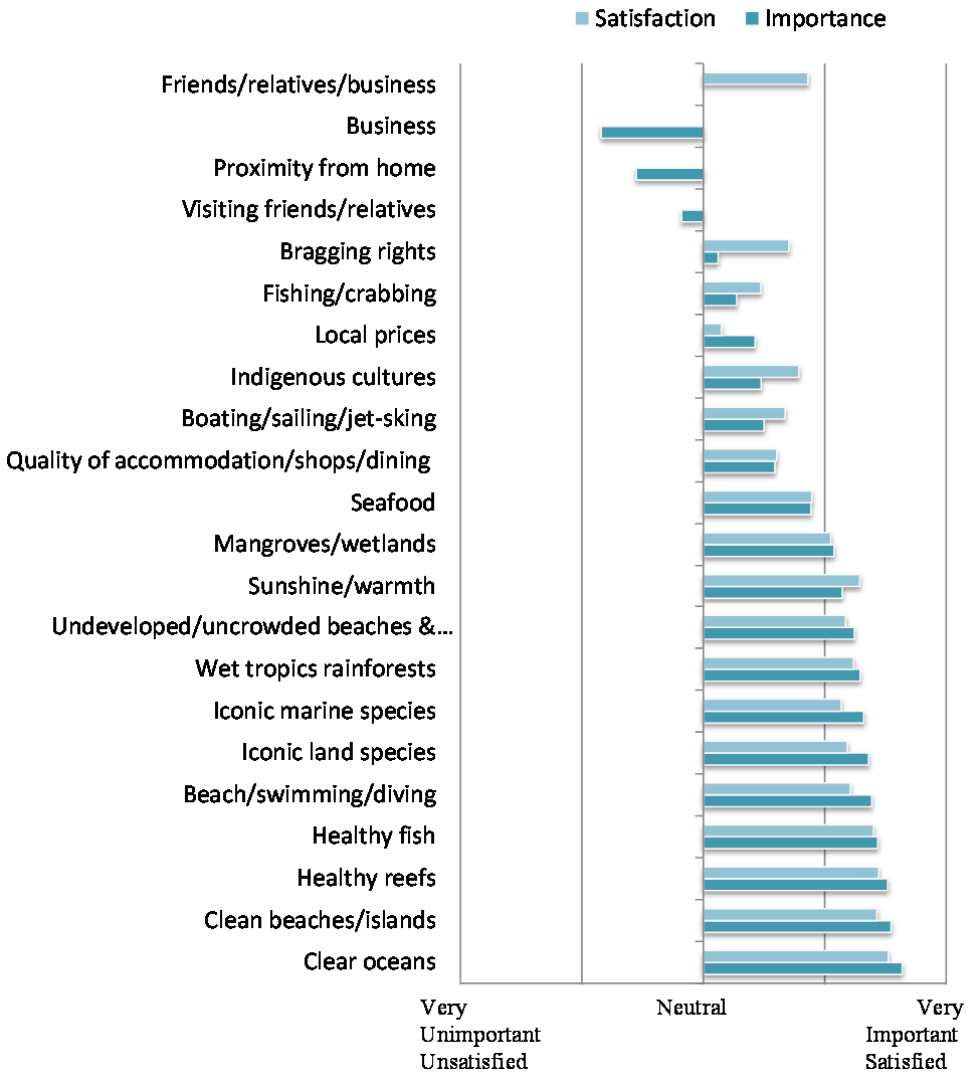

Figure 70: Importance and satisfaction scores – Chinese Visitors

5.6.4 What sorts of things would make these visitors decide not to come here?

Figure 69 below shows the reaction of respondents to hypothetical changes to the GBRWHA. More than two thirds of people felt that they would not have visited the area at all if there was twice as much coastal pollution caused by twice as many oil spills, ship groundings and waste spills (73%) and if the water changed from clear to murky (70%). About half of the people felt that they would not have visited the region if there was twice as much rubbish on beaches and islands (54%). About a third of them indicated that they would not come to the area at all if there were twice as many tourists (37%) and/or if there was half as much live coral (35%). About a fifth of them (24%) felt that they would not have decided to come to the region if there was half as many fish and less variety to look at. People did not seem to be all that bothered by the prospect of increase in local price (10%) and/or having less chance of catching fish (6%).

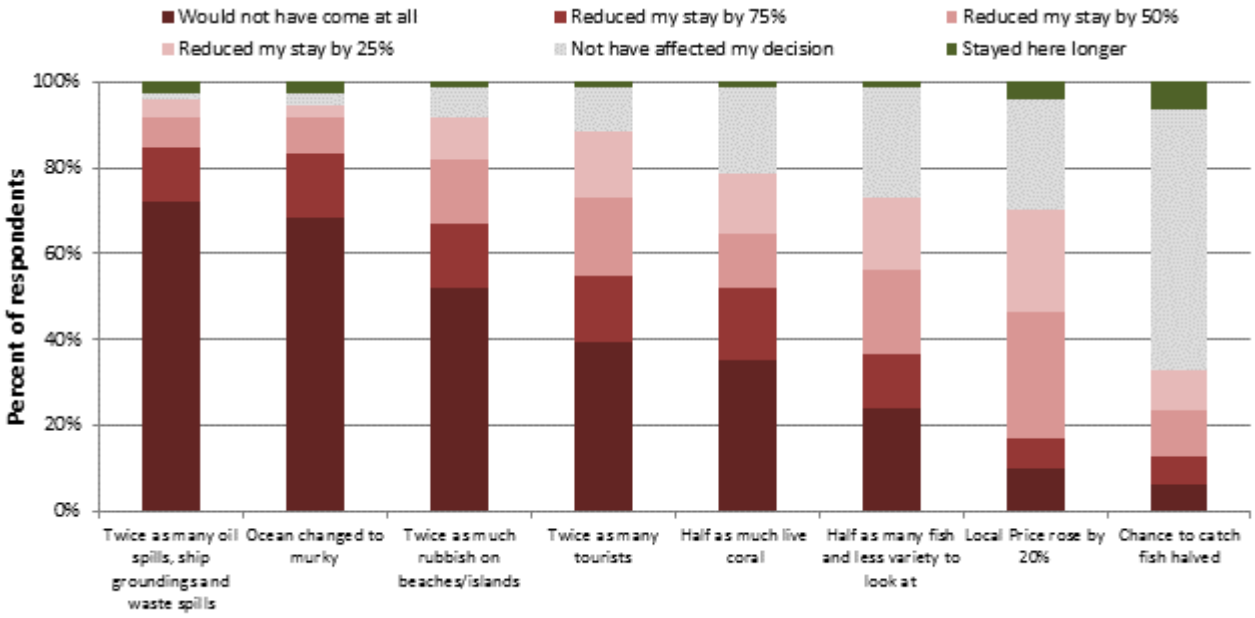

Figure 71: Chinese respondents' reaction to hypothetical changes in the GBRWHA

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Appendix 1: 'Values' identified during first round of workshops

SEEING A WIDE VARIETY OF MARINE SPECIES

SEEING ICONIC MARINE SPECIES

(e.g. whales, dugongs, turtles)

ATTENDING A BUSINESS, MEETING OR CONFERENCE

GOING TO THE GREAT BARRIER REEF

LEARNING ABOUT TRADITIONAL INDIGENOUS CULTURE

GOING TO THE WET TROPICS WORLD HERITAGE (RAINFOREST) AREA

SEEING AUSTRALIAN TERRESTRIAL WILDLIFE (e.g. kangaroos, koalas)

GOING FISHING AND CRABBING

BOATING

(e.g. motoring, jet skiing, sailing, kayaking)

BEING ABLE TO SAY I HAVE BEEN TO THE GBR

SPENDING TIME IN THE NATURAL ENVIRONMENT

SPENDING TIME ON THE BEACH

(walking, sitting, building sandcastles)

BEING IN A PLACE THAT IS CLEAN

(free from pollution)

BEING IN A PRETTY PLACE

RELAXING

VISITING FAMILY AND FRIENDS

EATING FRESH, LOCALLY CAUGHT SEAFOOD

ENJOYING THE CLIMATE/WEATHER

SWIMMING, DIVING AND/OR SNORKELLING

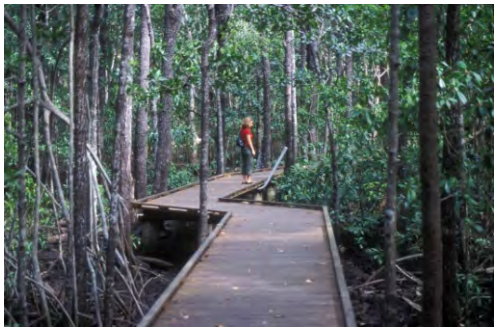
THE PRICE MATCHED MY BUDGET

BEING IN A PLACE WITH CLEAR (OCEAN) WATER AND GOOD VISIBILITY

DOING SOME ADVENTURE ACTIVITIES

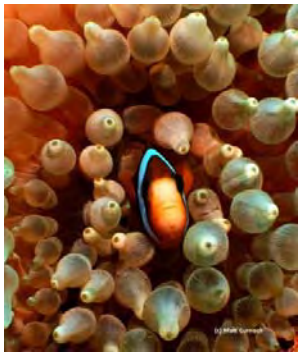
BEING IN A PLACE THAT IS NOT CROWDED

(free from congestion and major development)



SEEING COLOURFUL CORAL

SEEING LOTS OF SMALL FISH



SEEING LOTS OF LARGE FISH

SEEING LARGE MARINE ANIMALS

(e.g. sharks, rays, turtles)

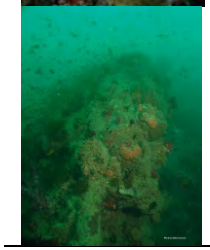
SEEING LOTS OF CORAL

STAYING IN QUALITY ACCOMMODATION

BEING ABLE TO SHOP AND DINE OUT

Appendix 2: WTP scenarios tested in the second round of workshops

WATER QUALITY



When water is clean and clear (like the picture on the top), the reef can recover from disasters (e.g. cyclones, bleaching events) relatively quickly. But sometimes water in the GBRWHA can become murky (like the picture on the bottom) – which makes affected areas more vulnerable to disease and disasters.

There are many different ways of trying to improve water quality, (e.g. keeping mangroves and wetlands; reducing chemical use, planting trees on the edges of creeks). But all cost money.

What is the MAXIMUM amount you would be willing to donate to a non-government, not-for-profit organisation to improve water quality in GBRWHA?

$0	$2 000
$10	$5 000
$20	$10 000
$30	$20 000
$50	$50 000
$75	$75 000
$100	$100 000
$200	$500 000
$500	$1 million
$1000	More than million

PORTS and SHIPPING

photo courtesy Mercator Media 2012

photo courtesy Pacific Tycoon

More than 5000 ships use the shipping lanes inside the GBR each year and there are 10 major trading ports along the coast. With this, comes the risk of shipping accidents (e.g. oil-spills). Port developments can also damage the environment, and it is possible for ships to introduce non-native species to the WHA.

There are ways of trying to reduce the risks of shipping accidents and/or of reducing the potential impacts of ports and shipping (e.g. regulating activities within ports). But they all cost money.

What is the MAXIMUM amount you would be willing to donate to a non-government not-for-profit organisation to reduce the risk of shipping &/or port disasters in GBRWHA?

$0	$2 000
$10	$5 000
$20	$10 000
$30	$20 000
$50	$50 000
$75	$75 000
$100	$100 000
$200	$500 000
$500	$1 million
$1000	More than million
$500 to $999	

TOP PREDATORS

At some locations on the GBR there has been a marked decrease in populations of top-predators (e.g. some sharks, coral trout and large cods). In protected areas, there are about 5 sharks per hectare; in other areas it is as low as one per hectare. When top predators disappear, other predators lower down the food chain can take over – sometimes with disastrous side effects.

There are many different ways of protecting top-predators in the GBRWHA (e.g. restricting some types of fishing). But they all cost money (e.g. imposing costs on the fishing and seafood industry, reducing seafood availability).

What is the MAXIMUM amount you would be willing to donate to a non-government not-for-profit organisation to protect top predators in the GBRWHA?

$0	$2 000
$10	$5 000
$20	$10 000
$30	$20 000
$50	$50 000
$75	$75 000
$100	$100 000
$200	$500 000
$500	$1 million
$1000	More than million
$500 to $999	

Appendix 3: Resident survey

Great Barrier Reef World Heritage Area Resident Survey A1

The Great Barrier Reef World Heritage Area (GBRWHA) is much more than just a reef. It includes islands, bays, beaches, estuaries and creeks, and it extends for more than 2000kms along the coast of Queensland (see the map below). This survey seeks the views of residents living 'near' the GBRWHA ... within about 200km of the coast.

1. Where do you usually live?
   - ❒ Australia, which postcode?_____
   - ❒ Overseas, which country?

   _____
2. Have you ever visited the GBRWHA
   - ❒ No (go to question 7, page 2)
   - ❒ Yes
3. How long did you spend in the GBRWHA on your most recent trip?
   - ❒ Half a day or less
   - ❒ About a day
   - ❒ 1 night
   - ❒ 2-3 nights
   - ❒ 4 nights or more
   - ❒ Do not remember
4. On the map, shade in the square(s) nearest your favourite place in the GBRWHA. This does not have to be the place you go to most often. Write the name of this place below:

   _____
5. Are there any places in the GBRWHA you have not been to but would really like to visit?

   _____

   _____

   _____

6. Please tell us how often you do each of the following in the GBRWHA. *(tick one box in each row)*

	Almost every day	A few times a month	About once a month	3-4 times a year	About once a year	Rarely	I have never done this
Spend time on the mainland beaches	❒	❒	❒	❒	❒	❒	❒
Spend time on the islands	❒	❒	❒	❒	❒	❒	❒
Spend time on offshore reefs	❒	❒	❒	❒	❒	❒	❒
Snorkel or scuba dive	❒	❒	❒	❒	❒	❒	❒
Go out on a private motor boat or jet-ski *About how long is the boat?____metres*	❒	❒	❒	❒	❒	❒	❒
Pay for a boat trip or island visit	❒	❒	❒	❒	❒	❒	❒
Go sailing, kayaking, windsurfing, etc	❒	❒	❒	❒	❒	❒	❒
Go fishing, spear-fishing, or crabbing	❒	❒	❒	❒	❒	❒	❒

1 | Page

7. How important are each of the following items to your overall quality of life? *(tick one box in each row)*

	Very important			Neutral	Very unimportant		I do not know
 BENEFITING FROM the jobs and income linked to: the reef-based tourism industry	❒	❒	❒	❒	❒		❒
the commercial fishing sector	❒	❒	❒	❒	❒		❒
 the mining and agricultural sectors	❒	❒	❒	❒	❒		❒
Benefiting from low prices associated with cheap shipping transport	❒	❒	❒	❒	❒		❒
BEING ABLE TO:							
 eat fresh locally caught seafood	❒	❒	❒	❒	❒		❒
go fishing, spear-fishing or crabbing	❒	❒	❒	❒	❒		❒
 spend time on the beach, go swimming, diving, etc	❒	❒	❒	❒	❒		❒
go boating, sailing or jet-skiing	❒	❒	❒	❒	❒		❒
 Protecting traditional/ Indigenous cultural values	❒	❒	❒	❒	❒		❒
Preserving the GBRWHA either for its own sake or for future generations	❒	❒	❒	❒	❒		❒
 "Bragging rights" - being able to say "I live near the Great Barrier Reef"	❒	❒	❒	❒	❒		❒
HAVING:							
 undeveloped and uncrowded beaches and islands	❒	❒	❒	❒	❒		❒
beaches and islands without visible rubbish (bottles, plastic)	❒	❒	❒	❒	❒		❒
 healthy coral reefs	❒	❒	❒	❒	❒		❒
healthy reef fish	❒	❒	❒	❒	❒		❒
 iconic marine species (whales, dugongs, turtles)	❒	❒	❒	❒	❒		❒
 clear ocean water (with good underwater visibility)	❒	❒	❒	❒	❒		❒
healthy mangroves and wetlands that clean polluted water from the land	❒	❒	❒	❒	❒		❒

8. Are any of the items in the table so important to you that you would move away from the region if it were not here or if it deteriorated?

❒ No ❒ Yes, please tell us what it is_____

9. How satisfied are you with each item below? Indicate whether all is well (very satisfied) or if there is something wrong (very unsatisfied). *(tick one box in each row)*

	Very satisfied			Neutral	Very unsatisfied		Not Applicable
 The benefits you receive from: the reef-based tourism industry	❒	❒	❒	❒	❒		❒
the commercial fishing sector	❒	❒	❒	❒	❒		❒
 the mining and agricultural sectors	❒	❒	❒	❒	❒		❒
cheap shipping transport	❒	❒	❒	❒	❒		❒
Your opportunities to:							
 eat fresh locally caught seafood	❒	❒	❒	❒	❒		❒
go fishing, spear-fishing or crabbing	❒	❒	❒	❒	❒		❒
 spend time on the beach, go swimming, diving, etc	❒	❒	❒	❒	❒		❒
go boating, sailing or jet-skiing	❒	❒	❒	❒	❒		❒
 The health/ status of traditional/ Indigenous cultural values	❒	❒	❒	❒	❒		❒
The chances that the GBRWHA will be preserved for future generations	❒	❒	❒	❒	❒		❒
 The status of your "Bragging rights" – knowing that people envy you for living near the Great Barrier Reef"	❒	❒	❒	❒	❒		❒
The status/health of the region's: beaches and islands - undeveloped and uncrowded	❒	❒	❒	❒	❒		❒
 beaches and islands - without visible rubbish (bottles, plastic)	❒	❒	❒	❒	❒		❒
 coral reefs	❒	❒	❒	❒	❒		❒
reef fish	❒	❒	❒	❒	❒		❒
 iconic marine species (whales, dugongs, turtles)	❒	❒	❒	❒	❒		❒
 oceans – clear water (with good underwater visibility)	❒	❒	❒	❒	❒		❒
mangroves and wetlands	❒	❒	❒	❒	❒		❒

10. To provide us with some background context, please think about your own life and personal circumstances. How satisfied are with your life as a whole? (*tick one box)*

Very satisfied		Neutral		Very unsatisfied	I do not know
❒	❒	❒	❒	❒	❒

What is the reason you feel this way? _____

11. How would each of the following affect your overall quality of life / satisfaction? *(tick one box in each row)*

	I would be much more satisfied				I would be much less satisfied	I do not know
If local prices rose by 20% compared to other places in Australia	❒	❒	❒	❒	❒	❒
If there was twice as much rubbish (e.g. bottles, plastic) on the beaches and islands	❒	❒	❒	❒	❒	❒
If there was half as much chance of catching fish	❒	❒	❒	❒	❒	❒
If there were half as many fish and less variety of fish to look at	❒	❒	❒	❒	❒	❒
If there was half as much live coral	❒	❒	❒	❒	❒	❒
If there were twice as many tourists	❒	❒	❒	❒	❒	❒
If the ocean water changed from clear to murky	❒	❒	❒	❒	❒	❒
If there were twice as oil spills, ship groundings and waste spills	❒	❒	❒	❒	❒	❒

The GBR faces many threats. Some of these are beyond our control (e.g. cyclones), but not all. Three major threats to the GBR are explained below

REDUCTIONS IN WATER QUALITY

IMPACTS: When ocean water is clean and clear, the reef can recover from disasters (e.g. crown of thorns starfish, cyclones, bleaching events) relatively quickly. But sometimes water in the GBRWHA can become unnaturally murky from land runoff and development, which makes affected areas more vulnerable to disease and disasters.

POSSIBLE SOLUTIONS INCLUDE: Maintaining mangroves and wetlands, reducing fertilizer and chemical use, avoiding overgrazing, planting trees on the edges of creeks, improving construction practices, etc.

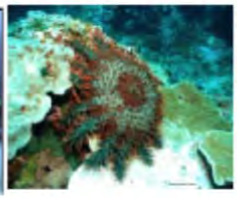
INCREASES IN PORTS AND SHIPPING ACCIDENTS

photo courtesy Mercator Media 2012

IMPACTS: More than 5000 ships use the shipping lanes inside the GBR each year and there are 10 major trading ports along the coast. Shipping accidents can cause direct damage to the reef and pollution such as oil spills. Port developments can also damage the environment, and it is possible for ships to introduce non-native species.

POSSIBLE SOLUTIONS INCLUDE: Changing where, when, and how many boats pass by the GBR; improving emergency procedures; improving accountability for foreign vessels; early detection of non-native species; mandating local pilots, etc.

OVER-FISHING OF 'TOP PREDATORS'



IMPACTS: If there are too few animals at the top of the food chain (e.g. some types of sharks and mackerels and large cods), other animals can increase in numbers. This can have unexpected, and possibly negative side effects (e.g. too many coral eating fish).

POSSIBLE SOLUTIONS INCLUDE: There are many existing rules and regulations to prevent over-fishing. But it would be possible to: enforce rules more strictly (particularly in no-fish zones); work with residents and fishers to foster 'best practice' fishing methods; closer monitoring of fish populations (stepping in if it looks like there is a problem), etc.

12. Imagine that a fund was set up to help solve the problems described above. Who would you trust to manage that fund? *(tick as many boxes as apply)*

❒ The Commonwealth Government ❒ The Queensland Government ❒ No one

❒ A Not-for-profit, non-government organization ❒ Other (please specify)_____

13. What is the maximum amount (out of your total household income) you would be willing to donate each and every year to that fund? (You could ask for the money to be deducted from your wages/salary/pension, or pay it as a lump sum once a year.)

When answering, please consider your household's current financial situation and also consider how much all your donations add up to if donating to more than one problem. *(tick one box in each row)*

	Money donated EACH YEAR											
	$0	$2	$5	$10	$25	$30	$50	$75	$100	$250	$500	More than $500
Improving ocean water quality	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ How much? $_____
Reducing the risk of shipping accidents	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ How much? $_____
Protecting top predators	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ How much? $_____

14. What method of payment would you most prefer? *(tick one box)*

❒ Annual donation (bpay, cheque or bank-transfer)

❒ Automatic deduction from your salary, pension, or other source of income (so you pay a smaller amount but you pay more often)

❒ One in a life-time payment (a larger amount, but only once)

15. How much do you agree or disagree with each of the following statements? (tick one box in each row)

	Strongly agree		Neutral		Strongly disagree	I do not know
I am willing to volunteer my time to care for the GBRWHA	❒	❒	❒	❒	❒	❒
Only people who live near or visit the GBRWHA have a responsibility to care for it	❒	❒	❒	❒	❒	❒
I am not prepared to pay money to protect the GBRWHA unless	❒	❒	❒	❒	❒	❒
All GBRWHA users pay too	❒	❒	❒	❒	❒	❒
People throughout Australia pay too	❒	❒	❒	❒	❒	❒
People throughout the world pay too	❒	❒	❒	❒	❒	❒
I am not prepared to take costly steps to protect the GBRWHA – those efforts are a waste of time in the face of natural disasters and climate change	❒	❒	❒	❒	❒	❒
The GBRWHA should be preserved for its own sake	❒	❒	❒	❒	❒	❒
If I lost my wallet/purse somewhere in the town I now live in, I would get it back - with all the money and cards still in it	❒	❒	❒	❒	❒	❒

Finally, we would like to collect background information that is used to test if different people (e.g. males, those on high incomes, etc.) feel differently about the GBRWHA.

16. What gender are you? *(tick one box)* ❒ Male ❒ Female

17. What is your marital status? *(tick one box)* ❒ Single ❒ Married ❒ Legal Partnership ❒ Other

18. In what year were you born? *(write the year)* 19_____

19. Where were you born?
❒ Australia, which town?_____ and state_____ ❒ Overseas,which country?_____

20. How many people, including yourself, normally live in your household?
Adults_____ Children (16 and younger) _____

21. Are you or any of the people who normally live with you Aboriginal or Torres Strait Islanders? *(tick as many boxes as apply)* ❒ Yes - Aboriginal ❒ Yes - Torres Strait Islander ❒ No

22. What is the highest level of education that you have completed? *(tick one box)*
❒ Primary school ❒ High school (year 12) ❒ University
❒ High school (year 10) ❒ Trade / apprenticeship ❒ Other (please specify)_____

23. Do you consider yourself to be a recreational fisherman/woman? *(tick one box)* ❒ No ❒ Yes

24. Do you make contributions to, or volunteer for any conservation organizations? *(tick all that apply)*
❒ Yes, International Conservation Organizations ❒ Yes, National & Local Conservation Organizations ❒ No

25. Please indicate which of the industries listed below is the main source (i.e. most important source) of your household's income? *(tick one box)*
❒ Retail (e.g. shops) ❒ Agriculture and Forestry ❒ Fishing
❒ Accommodation, cafes and restaurants ❒ Manufacturing ❒ Mining
❒ Government, Health and Education ❒ Tourism industry (other than above) ❒ Ports
❒ None - our household earns most of its money from other sources) ❒ I do not know

26. On average, how much pre-tax income does your household earn each year? *(tick one box)*
❒ $1 to $20 000 ❒ $60 000 to $80 000 ❒ $150 000 to $200 000
❒ $20 000 to $40 000 ❒ $80 000 to $100 000 ❒ above $200 000
❒ $40 000 to $60 000 ❒ $100 000 to $150 000 ❒ prefer not to specify ❒ I do not know

Thank you for your help! ☺

Appendix 4: Tourist survey version A

LOCATION: *Date:* *GBRWHA TOURISM - A1*

The Great Barrier Reef World Heritage Area (GBRWHA) is much more than just a reef; it includes islands, bays, beaches, estuaries and creeks, and it extends for more than 2000kms along the coast of Queensland (see the map below). For the purpose of this survey, the towns and beaches within 200km of the coast should be considered as being 'near' the GBRWHA.

1. Where do you usually live? ❒ Australia, which postcode? _____ ❒ Overseas, which country? _____

2. How often have you been to the coast near the GBRWHA?
   - ❒ This is my first visit
   - ❒ Once
   - ❒ 2-4 times
   - ❒ 5-10 times
   - ❒ more than 10 times
   - ❒ I do not remember

3. In total, how long do you plan to spend away from your home on this trip?
   - ❒ Half a day or less
   - ❒ About a day
   - ❒ At least one night, how many_____?

   How many of those nights will be spent near the GBRWHA? _____ nights

   How many nights have you spent near the GBRWHA so far? _____ nights

4. On the map, shade the area(s) you have visited or plan to visit **ON THIS TRIP**.

5. Place a number '1' next to the best place in the GBRWHA that you have been to so far **ON THIS TRIP** and write the name of the place below.

   _____

6. Are there any places in the GBRWHA you have not yet visited but are really looking forward to visiting?

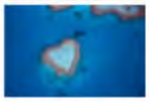
   _____

   _____

7. In total, about how often did you do each of the following **ON THIS TRIP**? *(tick one box in each row).* If you have not finished your trip, please tell us how often you THINK you will end up doing them.

	Never	Once	Twice	3 times	4 times	5 times	More than 5 times
Spend time on the mainland beaches	❒	❒	❒	❒	❒	❒	❒
Spend time on the islands	❒	❒	❒	❒	❒	❒	❒
Spend time on offshore reefs	❒	❒	❒	❒	❒	❒	❒
Snorkel or scuba dive	❒	❒	❒	❒	❒	❒	❒
Go out on a private motor boat or jet-ski *About how long is the boat?____metres*	❒	❒	❒	❒	❒	❒	❒
Pay for a boat trip or island visit	❒	❒	❒	❒	❒	❒	❒
Go sailing, kayaking, windsurfing, etc	❒	❒	❒	❒	❒	❒	❒
Go fishing, spear-fishing, or crabbing	❒	❒	❒	❒	❒	❒	❒

8. How IMPORTANT were each of the following factors when you made the decision to come to this part of Australia ON THIS TRIP? *(tick one box in each row)*

	Very important		Neutral		Very unimportant	I do not know
 Visiting friends and/or relatives	❒	❒	❒	❒	❒	❒
Attending to business, going to a meeting and/or conference	❒	❒	❒	❒	❒	❒
 Visiting a place which is close to where I live	❒	❒	❒	❒	❒	❒
 Finding a place where the price matched my budget	❒	❒	❒	❒	❒	❒
Having good quality accommodation, shops and restaurants	❒	❒	❒	❒	❒	❒
 BEING ABLE TO: eat fresh local seafood	❒	❒	❒	❒	❒	❒
go fishing, spear-fishing or crabbing	❒	❒	❒	❒	❒	❒
 spend time on the beach, go swimming, diving, etc	❒	❒	❒	❒	❒	❒
go boating, sailing or jet-skiing	❒	❒	❒	❒	❒	❒
 ENJOYING: Indigenous cultural experiences	❒	❒	❒	❒	❒	❒
Sunshine and warmth	❒	❒	❒	❒	❒	❒
 "Bragging rights" - being able to say "I have been to the Great Barrier Reef"	❒	❒	❒	❒	❒	❒
 SEEING/EXPERIENCING: undeveloped and uncrowded beaches and islands	❒	❒	❒	❒	❒	❒
beaches and islands without visible rubbish (bottles, plastic)	❒	❒	❒	❒	❒	❒
 healthy coral reefs	❒	❒	❒	❒	❒	❒
 healthy reef fish	❒	❒	❒	❒	❒	❒
Iconic marine species (whales, dugongs, turtles)	❒	❒	❒	❒	❒	❒
 clear oceans (with good underwater visibility)	❒	❒	❒	❒	❒	❒
the wet tropics world heritage rainforests	❒	❒	❒	❒	❒	❒
 iconic land species (kangaroos, cassowaries)	❒	❒	❒	❒	❒	❒
mangroves and wetlands	❒	❒	❒	❒	❒	❒

9. And how satisfied have you been with each item below **ON THIS TRIP?** *(tick one box in each row)*

		Very satisfied – all is good		Neutral		Very unsatisfied – something is wrong	Not applicable	I have not been here long enough to assess
	Your visit with friends / relatives or the success of your business trip	❒	❒	❒	❒	❒	❒	❒
	Local prices / the cost of your visit	❒	❒	❒	❒	❒	❒	❒
	The quality of accommodation, shops and restaurants	❒	❒	❒	❒	❒	❒	❒
	Your experiences: eating the local seafood	❒	❒	❒	❒	❒	❒	❒
	fishing, spear-fishing or crabbing	❒	❒	❒	❒	❒	❒	❒
	on the beach, go swimming, diving, etc	❒	❒	❒	❒	❒	❒	❒
	boating, sailing or jet-skiing	❒	❒	❒	❒	❒	❒	❒
	Your ability to enjoy: Indigenous cultural experiences	❒	❒	❒	❒	❒	❒	❒
	Sunshine and warmth	❒	❒	❒	❒	❒	❒	❒
	"Bragging rights" - being able to say "I have been to the Great Barrier Reef"	❒	❒	❒	❒	❒	❒	❒
	Your experiences &/or ability to see:							
	undeveloped and uncrowded beaches and islands	❒	❒	❒	❒	❒	❒	❒
	beaches and islands without visible rubbish (bottles, plastic)	❒	❒	❒	❒	❒	❒	❒
	coral reefs	❒	❒	❒	❒	❒	❒	❒
	reef fish	❒	❒	❒	❒	❒	❒	❒
	Iconic marine species (whales, dugongs, turtles)	❒	❒	❒	❒	❒	❒	❒
	clear oceans (with good underwater visibility)	❒	❒	❒	❒	❒	❒	❒
	the wet tropics world heritage rainforests	❒	❒	❒	❒	❒	❒	❒
	iconic land species (kangaroos, cassowaries)	❒	❒	❒	❒	❒	❒	❒
	mangroves and wetlands	❒	❒	❒	❒	❒	❒	❒

10. To help us gauge how 'safe' you have felt while here, please tell us how much you agree or disagree with the following statement

If I lost my wallet/purse somewhere in the town I am now visiting, I would get it back with all the money and cards still in it.

Strongly agree		Neutral		Strongly disagree	I do not know
❒	❒	❒	❒	❒	❒

11. To provide us with some background context, please think about the time you have spent near the GBRWHA **ON THIS TRIP**. How satisfied are with your experience as a whole? (*tick one box)*

Very Satisfied		Neutral		Very Unsatisfied	I do not know
❒	❒	❒	❒	❒	❒

What is the reason you feel this way? _____

12. So far, how well has this trip met your expectations? (*tick one box)*

Well above my expectations		Neutral		Well below my expectations	I do not know
❒	❒	❒	❒	❒	❒

13. How likely is it that you will return to visit the region in the future? (*tick one box)*

Will definitely return		Neutral		Will definitely NOT return	I do not know
❒	❒	❒	❒	❒	❒

14. How would the following hypothetical changes have affected your decision to visit this part of Australia (i.e. near the GBRWHA)? *(tick one box in each row)*

	POSITIVE IMPACT I may have stayed longer	ALMOST NO IMPACT This would not have affected my decision at all	SOME IMPACT I would have still visited but reduced the length of my stay by about 25%	50%	75%	HUGE NEGATIVE IMPACT I would not have come here at all	I do not know
If local prices rose by 20% (compared to other places in Australia)	❒	❒	❒	❒	❒	❒	❒
If there was twice as much rubbish (bottles, plastic) on the beaches and islands	❒	❒	❒	❒	❒	❒	❒
If there was half as much chance of catching fish	❒	❒	❒	❒	❒	❒	❒
If there were half as many fish and less variety to look at	❒	❒	❒	❒	❒	❒	❒
If there was half as much live coral	❒	❒	❒	❒	❒	❒	❒
If there were twice as many tourists	❒	❒	❒	❒	❒	❒	❒
If the ocean water changed from clear to murky	❒	❒	❒	❒	❒	❒	❒
If there were twice as many oil spills, ship groundings and waste spills from the ports	❒	❒	❒	❒	❒	❒	❒

We would like to learn more about the money that you have spent in and around the GBRWHA (i.e. within about 200km of the coast) while on this trip away from home.

15. On average, how much have you and your travel party (e.g. family) spent PER DAY (in and around the GBRWHA) on each of the following items while **ON THIS TRIP?** *(tick one box for each row)* If you are not at the end of your trip, please just tell us approximately how much you THINK you will spend on each item, each day you are here.

SPENDING PER DAY (AU$) while in the GBRWHA region	$0	$1-20	$21-50	$51-100	$101-151	$151-200	$201-300	More than $300 per day
Food and drinks bought at grocery and convenience stores	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Food and drinks bought at cafés, restaurants, bars, etc (including takeaways)	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Accommodation	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____

16. What is the approximate TOTAL AMOUNT that you and your travel party (e.g. family) has spent (in and around the GBRWHA) on these other items? *(tick one box for each row)* If you are not at the end of your trip, please just tell us approximately how much you THINK you will spend on each of these items IN TOTAL while here.

TOTAL SPENDING (AU$) while in the GBRWHA region	$0	$1-20	$21-50	$51-100	$101-200	$201-400	$401-600	More than $600
Hire cars	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Fuel	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Fishing charters	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Other boating trips and excursions (including non-fishing boat charters, ferries and snorkelling/diving trips)	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Entry into other local attractions / tours not covered above	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Souvenirs	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____
Other (please specify) _____	❒	❒	❒	❒	❒	❒	❒	☐, how much? $_____

17. How many people does this expenditure cover?
    Adults _____
    Children (16 and younger) _____

18. For your entire trip away from home, what was (or will be) your total expenditure for all people you told us about in question 17? Include airfares, train travel or other costs getting to this region, accommodation, tours and other expenses. AU$_____
    If you do not know how much using Australian dollars, please tell us how much in your own currency
    amount: _____ currency: _____

Finally, we would like to collect background information about you and your trip – this is used to test if different people (e.g. families, those on high incomes, etc) feel differently about the GBRWHA.

19. How did you travel from your home to this survey location? *(tick all that apply)*
    ❒ Bus ❒ Boat ❒ Rail ❒ Air
    ❒ Privately owned car ❒ Rented car ❒ Other (please specify) _____

20. Which of these best describes your travel party (i.e. the group you are travelling with)? *(tick one box)*
    ❒ Single ❒ Couple ❒ Family with children ❒ Relatives ❒ Friends ❒ Club ❒ Tour group
    ❒ Other (please specify) _____

21. What gender are you? *(tick one box)* ❒ Male ❒ Female

22. What is your marital status? *(tick one box)* ❒ Single ❒ Married ❒ Legal Partnership ❒ Other

23. In what year were you born? *(write the year)* 19_____

24. Where were you born?
    ❒ Australia, what town?_____ and state?_____ ❒ Overseas, what country?_____

25. How many people, including yourself, normally live in your household?
    Adults _____ Children (16 and younger) _____

26. Are you or any of the people who normally live with you an Australian Aboriginal or Torres Strait Islanders? *(tick as many boxes as apply)* ❒ Yes - Aboriginal ❒ Yes - Torres Strait Islander ❒ No

27. What is the highest level of education that you have completed? *(tick one box)*
    ❒ Primary school ❒ High school (year 12) ❒ University
    ❒ High school (year 10) ❒ Trade / apprenticeship ❒ Other (please specify)_____

28. Do you consider yourself to be a recreational fisherman/fisherwoman? *(tick one box)*
    ❒ No ❒ Yes.

29. Do you make contributions to, or volunteer for any conservation organizations? *(tick all that apply)*
    ❒ Yes, International Conservation Organizations ❒ Yes, National & Local Conservation Organizations
    ❒ No

30. Please indicate which of the industries listed below is the most important source of income for your household? *(tick one box)*
    ❒ Retail (e.g. shops) ❒ Agriculture and forestry ❒ Fishing
    ❒ Accommodation, cafes and restaurants ❒ Manufacturing ❒ Mining
    ❒ Government, Health and Education ❒ Tourism industry (other than above) ❒ Ports
    ❒ None of these industries (our household earns most of its money from other sources) ❒ I do not know

31. On average, how much pre-tax income does your household (you and everyone you live with) earn each year? *(tick one box)*
    ❒ $1 to $20 000 ❒ $60 000 to $80 000 ❒ $150 000 to $200 000
    ❒ $20 000 to $40 000 ❒ $80 000 to $100 000 ❒ above $200,000
    ❒ $40 000 to $60 000 ❒ $100 000 to $150 000 ❒ prefer not to specify ❒ I do not know

    If you do not know how much using Australian dollars, please tell us how much in your own currency
    amount: _____ currency: _____

Thank you for your help! ☺

Appendix 5: Tourist survey version B, pages 4 and 5 (all other pages identical to version A)

10. To provide us with some background context, please think about the time you have spent near the GBRWHA **ON THIS TRIP**. How satisfied are with your experience as a whole? (*tick one box)*

Very Satisfied		Neutral		Very Unsatisfied	I do not know
❒	❒	❒	❒	❒	❒

What is the reason you feel this way? _____

11. So far, how well has this trip met your expectations? (*tick one box)*

Well above my expectations		Neutral		Well below my expectations	I do not know
❒	❒	❒	❒	❒	❒

12. How likely is it that you will return to visit the region in the future? (*tick one box)*

Will definitely return		Neutral		Will definitely NOT return	I do not know
❒	❒	❒	❒	❒	❒

The GBR faces many threats. Some of these are beyond our control (e.g. cyclones), but not all. Three major threats to the GBR are explained below

REDUCTIONS IN WATER QUALITY

IMPACTS: When ocean water is clean and clear, the reef can recover from disasters (e.g. crown of thorns starfish, cyclones, bleaching events) relatively quickly. But sometimes water in the GBRWHA can become unnaturally murky from land runoff and development, which makes affected areas more vulnerable to disease and disasters.

POSSIBLE SOLUTIONS INCLUDE: Maintaining mangroves and wetlands, reducing fertilizer and chemical use, avoiding overgrazing, planting trees on the edges of creeks, improving construction practices, etc.

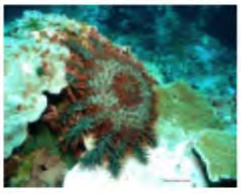
INCREASES IN PORTS AND SHIPPING ACCIDENTS

photo courtesy Mercator Media 2012

IMPACTS: More than 5000 ships use the shipping lanes inside the GBR each year and there are 10 major trading ports along the coast. Shipping accidents can cause direct damage to the reef and pollution such as oil spills. Port developments can also damage the environment, and it is possible for ships to introduce non-native species.

POSSIBLE SOLUTIONS INCLUDE: Changing where, when, and how many boats pass by the GBR; improving emergency procedures; improving accountability for foreign vessels; early detection of non-native species; mandating local pilots, etc.

OVER-FISHING OF 'TOP PREDATORS'



IMPACTS: If there are too few animals at the top of the food chain (e.g. some types of sharks and mackerels and large cods), other animals can increase in numbers. This can have unexpected, and possibly negative side effects (e.g. too many coral eating fish).

POSSIBLE SOLUTIONS INCLUDE: There are many existing rules and regulations to prevent over-fishing. But it would be possible to: enforce rules more strictly (particularly in no-fish zones); work with residents and fishers to foster 'best practice' fishing methods; closer monitoring of fish populations (stepping in if it looks like there is a problem), etc.

13. Imagine that a fund was set up to help solve the problems described above. Who would you trust to administer the money? *(tick as many boxes as apply)*

❒ The Commonwealth Government ❒ The Queensland Government ❒ No one
❒ A Not-for-profit, non-government organization ❒ Other (please specify)_____

14. What is the maximum amount you would be willing to donate to that fund each time you visit the GBRWHA? (Donations would be collected from each visitor to the region – like an accommodation charge, and would replace the current *environmental management charge* which is only paid by those who take commercial trips to the reef).

When answering, please consider your current financial situation and also consider how much all your donations add up to if donating to more than one problem. *(tick one box in each row)*

	Money donated PER VISIT to the region											
	$0	$2	$5	$10	$20	$30	$50	$75	$100	$250	$500	More than $500
Improving ocean water quality	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐, if so, how much? $_____
Reducing the risk of shipping accidents	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐, If so, how much? $_____
Protecting top predators	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐, If so, how much? $_____

15. How much do you agree or disagree with each of the following statements? *(tick one box)*

	Strongly agree			Neutral	Strongly disagree	I do not know
I am willing to volunteer my time to care for the GBRWHA	❒	❒	❒	❒	❒	❒
Only people who live near or visit the GBRWHA have a responsibility to care for it	❒	❒	❒	❒	❒	❒
I am not prepared to pay money to protect the GBRWHA unless All GBRWHA users pay too	❒	❒	❒	❒	❒	❒
People throughout Australia pay too	❒	❒	❒	❒	❒	❒
People throughout the world pay too	❒	❒	❒	❒	❒	❒
I am not prepared to take costly steps to protect the GBRWHA – those efforts are a waste of time in the face of natural disasters and climate change	❒	❒	❒	❒	❒	❒
The GBRWHA should be preserved for its own sake	❒	❒	❒	❒	❒	❒
If I lost my wallet/purse somewhere in the town I am now visiting, I would get it back - with all the money and cards still in it	❒	❒	❒	❒	❒	❒