Rainforest tourism drivers, trends and management tools: Synthesis report

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The four-year term of the Australian Government's Marine and Tropical Sciences Research Facility (MTSRF) officially concluded at the end of June 2010. The Commonwealth Environmental Research Facilities (CERF) Transition Program for the MTSRF aimed to deliver new and additional synthesis products based on the contemporary information needs of the primary end users through the synthesis and analysis of pre-existing MTSRF outputs. In addition, the MTSRF Transition Program extended research that is highly relevant to the future CERF key investment areas of the Great Barrier Reef and Torres Strait, northern Australia and terrestrial biodiversity.

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Contents

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1. Introduction

The aim of this report is to present a synthesis of research undertaken by James Cook University tourism researchers into aspects of tourism in the Wet Tropics rainforests of Tropical North Queensland. It also discusses two models that may be used as management tools for rainforest tourism. Funding for this research has been provided by the Australian Government's Marine and Tropical Sciences Research Facility program (MTSRF) Project 4.9.2. The report examines trends and drivers of tourism in the Wet Tropics World Heritage Area (WTWHA). The discussion commences with an analysis of events that may have affected tourism in Tropical North Queensland followed by a discussion of data collected from visitors to the WTWHA. The report then synthesises data collected during the life of the project and outlines rainforest management tools developed during the project. Finally, the report highlights information gaps in rainforest tourism research and provides suggestions for future research.

1.1 Overview of data collection

Data used in this synthesis report was collected through visitor surveys undertaken in the Wet Tropics and Cairns Airport as part of MTSRF Project 4.9.2(a) *Report on the sustainable use of rainforest resources by the tourism industry*.

Wet Tropics Rainforests Visitor Monitoring Project (MTSRF Project 4.9.2)

Primary data was collected from visitors using a self-completed survey instrument distributed at a number of locations in the Wet Tropics region. To develop a representative distribution system, surveys were collected at a number of sites by employees of participating tour operators and on-site survey staff employed by the project.

Industry support was sought and discussions were held with the operational managers and business directors/owners of a number of businesses operating in the rainforest. Three large and one small tour operator, and two visitor attractions offered their support. Tour operators distributed surveys via tour guides in the Atherton Tablelands and Daintree National Park areas. Visitor attraction staff, under the guidance of operations managers, distributed surveys to visitors at these sites. This limited the randomisation of the data, but was seen to be a necessary and acceptable compromise to ensure survey returns.

The two sites surveyed by JCU survey staff were Mossman Gorge and the Daintree Discovery Centre. Both sites are visited by a large number of tourists. Trained research assistants spent one day each month surveying visitors at Mossman Gorge and one day each month at the Daintree Discovery Centre, alternating surveying days between weekdays and weekends. The survey contained a combination of questions on socio-demographics, motivations (using a Likert scale), behaviours, travel patterns and satisfaction.

Cairns Airport Visitor Monitoring Project (MTSRF Project 4.9.2)

The Cairns Airport visitor survey was conducted at the domestic terminal of the Cairns Airport. Surveying was undertaken twice a month by trained research assistants.

How this research may be used

A major aim of the project was to create two comprehensive data sets that could be used as baselines against which to measure changes in the future. The first three years of data for each survey was aggregated to create a **three year average** for each data set. This means that yearly variations can be smoothed and the average used as a baseline against which to measure change in the future.

What this research does not report

The research was not designed to provide information on the overall numbers of visitors to the region or the Wet Tropics rainforest or how these figures vary on a yearly basis.

Research funded by Tourism Research Australia is able to provide high quality data on visitor numbers to the destination and, to a limited extent, knowledge about visitor activities including visiting protected areas.

1.2 Limitations

The research approach adopted in this research has a number of limitations that should be considered before generalising results. First, seasonality was a major limitation in the Wet Tropics Rainforest survey. During the 'low tourist season' (January to March, and again in November and December), many rainforest tour operators either closed for the season or operated smaller numbers of tours to WTWHA locations. Moreover, during this period, the 'wet season' generated long periods of heavy rainfall and localized flooding. These conditions deterred self-drive visitors from travelling to rainforest locations such as Paluma, Daintree and Mossman Gorge. As a consequence, it was difficult to achieve a high rate of sampling during this period.

Another limitation in each survey was the potential for specific nationalities being overlooked because survey instruments were not available in their language. The data collected in this research is specifically designed to track changes in motives and test a range of other aspects of visitor behavior. It *was not designed* to identify changes in visitor numbers to the region.

A final limitation that should be considered is the potential for social desirability bias where respondents over report 'good' behaviors and under report 'bad' or 'least desirable' bahaviours. For this reason care should be exercised if data on visitor intensions are to be used in policy decisions

2. Drivers, trends and crises

The following discussion examines the concept of drivers and trends and identifies how these factors along with crises can impact on rainforest tourism.

2.1 Drivers of rainforest tourism

In this section, tourism-relevant events that have taken place since the start of the project in 2006 are considered in the context of tourism in the Wet Tropics rainforests. Events of this nature include those that occur at a local level and influence the supply side of rainforest tourism, and those that occur outside of the region and affect the demand side of rainforest tourism, destination image and the role of the media.

Underlying changes in visitor flows are caused by a variety of drivers, trends and crises. Understanding the potential impact of these factors is important if destinations are to maximize income from tourism. These forces operate in both the supply side (the destination) and the demand side (tourists) usually through impacts on destination 'pull' factors and consumer 'push' factors. Pull factors describe those attributes of a destination that tourists find sufficiently interesting and attractive to pursue them to visit a specific destination. Push factors describe personal characteristics and values that govern the individual tourist's demand for travel and may include curiosity, personal income, free time \and personal values. Drivers are defined (Prideaux 2009) as '…those *factors that underpin change* and cause it to occur.' Numerous drivers operate at international, national, regional and personal levels. Global drivers include: changes in technology, major international events such as the Global Financial Crisis (GFC), the growth of the service economy, world economic growth, an increasing number and variety of destinations, climate change and global security issues. National drivers include economic conditions, political issues and fertility rates. Personal drivers that influence the individual's level of consumption of tourism products include: rising travel demand by baby boomers and younger generations, acceptance that change is a normal condition of life, the fashionability of travel, growth in personal disposable income and the observation that travel is now an ordinary consumer good not a luxury. Collectively these drivers influence the demand for travel on personal, national and global levels.

Trends are defined (Prideaux 2009) as "… those sequences of events that can be identified in the present and which, unless remedial action is taken, will cause some magnitude of disruption, or progress, in the future. Several types of trends affect tourism:

- Short-term trends that affect the level of demand for specific destinations,
- Long-term trends occur where there is a fundamental shift such as the emergence of new forms of tourism demand or return to a prolonged period of economic growth.

Crises are unexpected events that occur on a number of scales from personal to global. Each crisis event is unique but generally has three distinct time periods: the period prior to the crisis, the period of the crisis and the period after the crisis. The ability of destinations to respond to each crisis period will be determined by their level of preparedness, the severity of the crisis and the time period that the crisis occupies.

The relationship between drivers, trend and crises and their impact on destinations is illustrated in Figure 1 (Prideaux, 2009). Crises, trends and drivers create *impacts* that must be met with *responses* that include policies, investments, innovation and marketing. The present is a reflection of how destinations have responded to impacts in the past while the future will be to some extent determined by how the destination responds to current impacts.

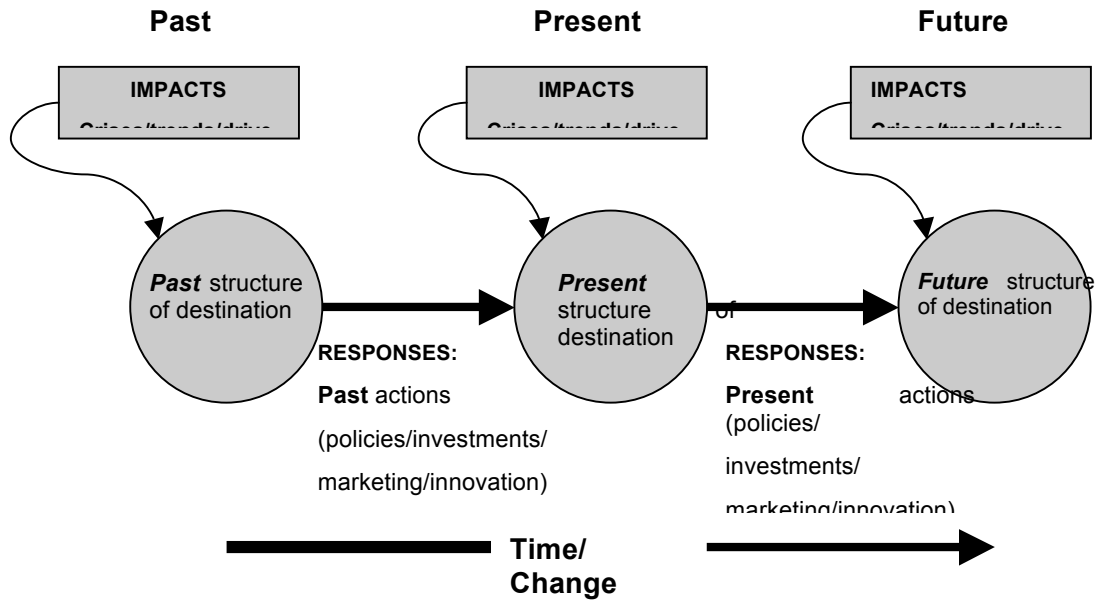

Figure 1: **The role of impacts and responses in the present and future structures of destinations.**

Source: Prideaux 2009.

The events outlined in Figure have affected the rainforest tourism sector and the image of the rainforest as a desirable place to visit. Events such as the Global Financial Crisis (GFC) and the increase in the value of the Australian dollar created strong negative impacts, resulting in a decline in visitor numbers. In 2010, as the impact of the GFC abated, the introduction of additional airline services has increased the region's capacity.

In tourism marketing, destination image is seen as an important area of research given that consumers base their decision to visit on the ability of destinations to communicate positive images in the market. This process is described as the ability of a destination to align its 'pull' factors with consumer 'push' factors. Tropical North Queensland's main pull factors include the Great Barrier Reef, the Wet Tropics rainforests, the ability to provide rest and relaxation, and climate. Pull factors are highlighted and promoted through destination images in promotional literature (travel brochures, posters), and the general media (newspapers, magazines, television, books, movies) (Echtner and Ritchie 2003). While promotional images are largely generated by the industry and their marketing bodies as they seek to create a positive destination image, the media is an independent force that, under certain "crisis" circumstances, may generate harmful images of the tourism industry in a region.

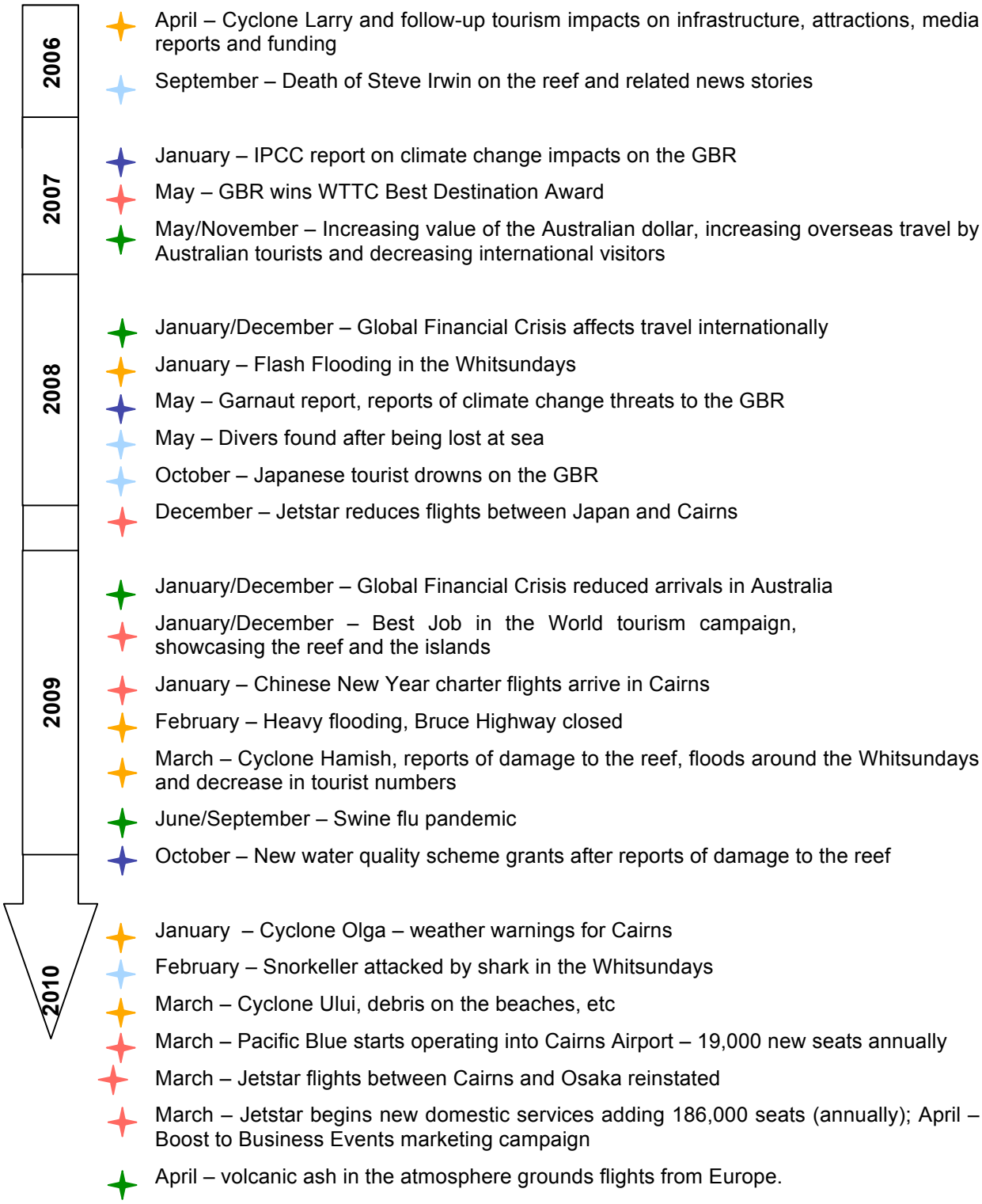

Figure 2: Description of events related to: destination management, natural resource management, localized natural disasters, incidents at the reef, events impacting on sources markets.

Source: Coghlan and Prideaux 2012.

Since data collection started in 2007, a number of natural disasters have occurred within the Wet Tropic Region (defined broadly as the coastal region that extends from Paluma in the south to Cooktown in the north). The most significant natural disasters were Cyclone Larry which struck the Mission Beach, Innisfail region in 2006 and the 2009 Bruce Highway closure due to flooding. The impacts of Cyclone Larry on the tourism industry were extensively reported by Prideaux and Falco-Mammone (2010). Of less significance for rainforest tourism, but still important because of the interdependence of the reef and rainforest as major travel motivations for visiting the region, were concerns about the potential impact of cyclones and climate change on the health of the Great Barrier Reef. If levels of concern grow to the extent that they begin to have negative impacts on tourists' perception of the region and its ability to deliver a premium holiday experience, tourism numbers will decline with a flow-on effect on rainforest tourism.

Box 1 (Coghlan and Prideaux 2012) illustrates how events such as a cyclone may influence tourism by causing concern about the quality of the tourism experience the region is able to deliver.

BOX 1: Cyclone debris threat to Great Barrier Reef

The Great Barrier Reef faces an environmental disaster as marine debris is swept out to sea, turning cyclone ravaged Whitsundays into a junkyard. Volunteers are in a race against time to stop tonnes of toxic debris lining the shores being dumped on fragile coral reef ecosystems in the world-renowned Whitsunday islands by a high tide. Experts fear that marine life, including fish, turtles and dugong, could be choked by the vast armada of post-cyclone rubbish.

A number of external crisis events have affected the region, including the Global Financial Crisis (GFC) of 2008–09 and the swine flu pandemic of 2009. The impact of events such as the GFC cannot be ignored in the context of rainforest tourism. In a study of reef tourism, Cater (2005) suggested that there is a strong correlation between stagnant visitor numbers (mid-1990s to present) and economic factors such as the Asian economic crisis, and social and political instability. Extending the observations made about marine tourism to rainforest tourism, it is apparent that external shocks to the tourism system do have impacts. Below average visitor numbers in 2010 are most likely an after affect of the GFC. While employment is growing in many economies, including Australia, and most nations had returned to positive economic growth by June 2010, consumer demand for tourism is still restrained. As a class of personal expense, tourism activity remains a luxury or indulgent activity for many people. When consumer sentiment is positive, most consumers show little hesitation in undertaking holiday activity. However, when consumer sentiment is low, as continues to be the case in many countries in the post GFC environment, consumers are hesitant to commit funds for holidays.

Media coverage

Media coverage of rainforest issues has generally been restricted to the after effects of Cyclone Larry and is reported in Prideaux and Falco-Mammone (2010). To date there has been little discussion about possible impacts of climate change on the rainforest. However, this has not been the case for the GBR (Box 2). Adverse reporting on the condition of the GBR can affect consumers' images of the region, leading to decisions to visit other less

affected destinations. Box 2 illustrates how media reports are able to affect reef tourism and, indirectly, rainforest tourism. Concerns raised in the media about the adverse effects of climate change on the GBR that were extensively reported after the release of the 2007 IPCC report may lead tourists to avoid the region fearing that one of its major icons and principal 'pull' factor has suffered considerable damage. It may also stimulate increasing rates of visitation in the short term from 'last chance' tourists, where the major selling point is to see a natural attraction before it disappears (Eijgelaar et al., 2010).

BOX 2: Race against time to save Great Barrier Reef

AUSTRALIA has just 20 years to save the Great Barrier Reef from significant damage by ocean acidification, one of the nation's foremost authorities on marine science has warned. In Cairns yesterday, Dr Charlie Veron, the former chief scientist of the Australian Institute of Marine Science, said the threat of ocean acidification was not being taken seriously.

Dr Veron, who is regarded as the "grandfather" of coral reef science in Australia, having discovered 20 per cent of the world's corals, predicted the Great Barrier Reef would suffer severe damage as a result of the process within the next 20 years. "Around about 2030, carbon dioxide levels will have reached a point where ocean warming will be killing off most shallow water corals,'' he said. "You don't have to be a scientist to understand that. You just have to look at what's happened over the past 30 years.''

Cairns Post Thursday, June 10, 2010

Source: Daniel Bateman (Cairns Post 10 June 2010: p1.)

The media can also create positive images that enhance a destination's 'pull' effect. The recent Tourism Queensland campaign 'The Best Job in the World' (Figure) attracted considerable interest by the international media and delivered an estimated AU$400 million in media coverage as well as attracting 55,002,415 visits to the job's web page, with an average of 8.25 minutes time spent on the site (www.ourawardentry.com.au). While this campaign focused solely on the reef, most of the new visitors attracted by the campaign can be expected to visit the Wet Tropics Rainforests if they visit the TNQ section of the reef.

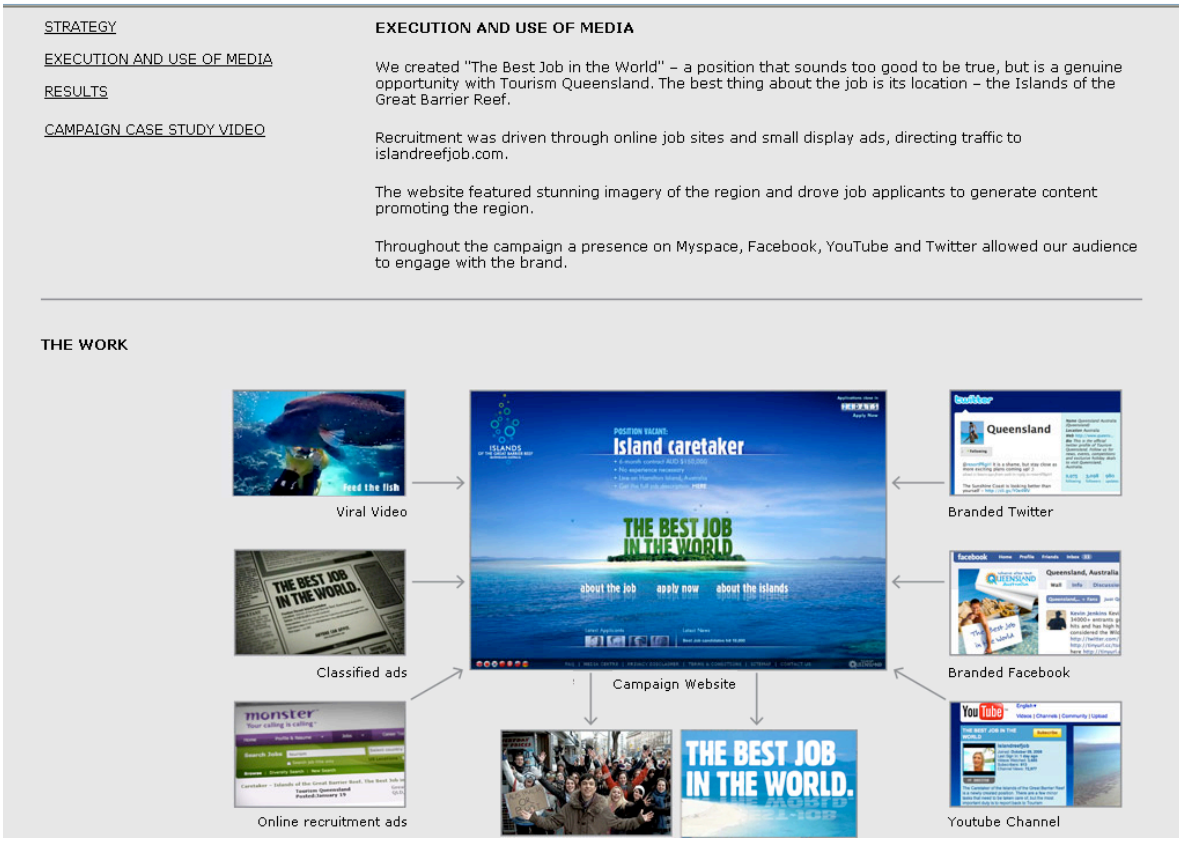

Figure 3: The 'Best Job in the World' campaign and use of media from http://www.ourawardentry.com.au/bestjob/execution-of-media.html.

The role of destination marketing organizations

Destination marketing organizations such as Tourism Tropical North Queensland and the Port Douglas Daintree Tourism Association, as well as airlines, major hotels and major visitor attractions such as Skyrail and Quicksilver, have significant roles to play in promoting rainforest tourism by extolling positive images of the region and by combining to reduce the impact of negative images. A key element in the ability of marketing organizations to develop and maintain positive destination images is the ability to access high quality research data on visitor trends.

Demand-side Issues

The previous discussion focused on demand side issues that affect rainforest tourism. Supply-side issues also need to be considered. The rainforest is located in a peripheral location relative to TNQ's major domestic and international visitor generating regions. Two aspects of peripherality need to be considered. The distance of TNQ from major generating regions, both domestically and internationally, creates a price and time disincentive that must be overcome by marketers as they seek to convince consumers that a visit to the region is a worthwhile investment. As the cost and time of travel increase (Prideaux 2000) the potential size of the visitor market for a specific generating region, measured as first-time and repeat visitor numbers, declines. Once this aspect of peripherality is overcome there remains the distance of the rainforest from major tourist hubs. This is less an issue for those areas of the rainforest that are close to major tourist hubs (Kuranda and Cairns for example) than those that are more distant (Cape Tribulation and the forest south of Innisfail for example). The introduction of low-cost carrier (LCC) air services in Australia has negated many of the cost issues related to peripherality, making TNQ more accessible to an increasing number of domestic and international visitors.

2.2 Concluding observations

Collectively, trends, drivers and crises, both within and outside the region, affect rainforest tourism. While often difficult to measure, these factors should be regularly monitored. Section 5 of this report contains a model for monitoring the impact of climate change on rainforest tourism. At present, and as demonstrated by result outlines in Figure 18, rainforest visitors do not see climate change as a major threat. However, if global mitigation efforts are ineffective in the long run, the forest will suffer from the affects of climate change and the tourism industry and protected area management authorities will be forced to develop adaptation strategies.

Crisis events are unplanned events that can affect the region and either directly or indirectly affect rainforest tourism (Prideaux and Falco-Mammone 2010). For example, Cyclone Larry had a direct impact by reducing the quality of the rainforest experience while coral bleaching may have an indirect affect by reducing overall visitor numbers to the region.

As in the past, trends, drivers and crises will continue to affect TNQ's rainforest tourism sector. Understanding the cause and effect aspects of these factors is therefore important and gives managers some ability to prepare for crisis events and to identify trends and drivers that will affect the Wet Tropics in the future. The following discussion highlights the importance of ongoing research into these elements of rainforest tourism.

3. Methodology

The following discussion highlights significant findings of *Project 4.9.2 Sustainable nature based tourism: planning and management*. Objective (a) of the project was: To report on the sustainable use of rainforest resources by the tourism industry and to report on the profile of tourists departing Tropical North Queensland (TNQ) from the domestic terminal of the Cairns International Airport. For a more detailed analysis of rainforest tourism patterns readers are referred to Sibtain and Prideaux (2010a). Questions concerning visitor socio-demographics, travel behaviour and satisfaction were consistent between the reef survey and the airport exit survey. The rainforest survey was designed to collect specific data on rainforest visitors (Figure 4 shows collection locations).

The survey instrument for both surveys contained questions on socio-demographics, motivations (using a Likert scale), behaviours, travel patterns and satisfaction. Responses are collected through a mix of closed, Likert-scale and open-ended questions. Open-ended questions minimize interviewer bias that may signal how respondents should react and allow respondents to give richer responses than are possible with closed questions (Altinay & Paraskevas, 2008).

Information collected in the surveys includes visitors' socio-demographic characteristics, travel patterns, motivations, activities, alternative destinations considered, previous rainforest tourism experience and satisfaction, including measures of expectations, recommendations to others, and value for money. Following discussions with relevant stakeholders, 19 travel motives were identified.

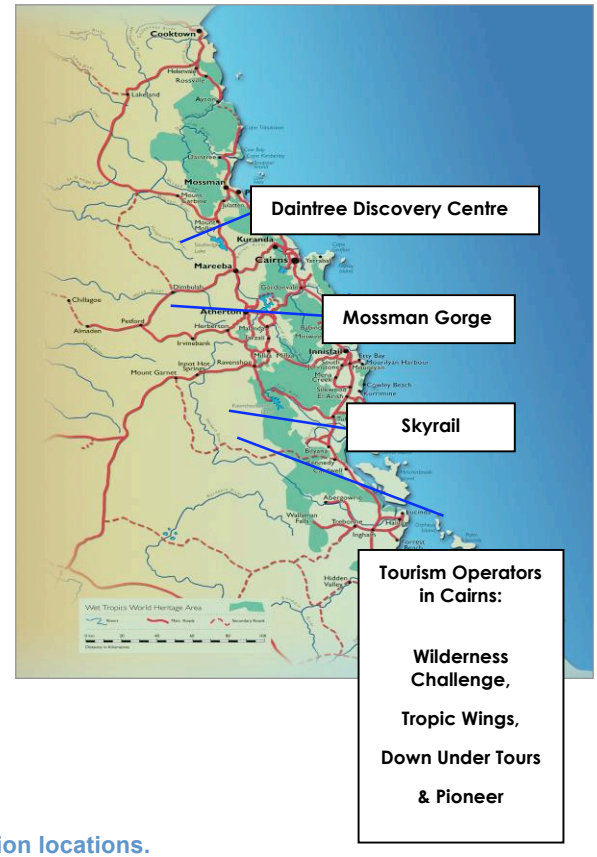

Figure 4: Survey distribution locations.

Source: Wet Tropics (2010).

4. Findings

4.1 Rainforest survey results

The specific aim of the rainforest survey was to develop a comprehensive quarterly data set that investigates a range of issues including demographic profiles, motivations, activities, risks, environmental attitudes, segmentation and seasonality. The following discussion highlights key findings of the rainforest survey for the period 2007 to 2009.

Socio-demographics

Gender and origin of surveyed visitors

Figure shows the origin of visitors in the 2007–2009 survey period, as well as for 2007, 2008 and 2009. Domestic visitors constituted the largest visitor segment for the 2007–2009 survey period (54.9%), followed by visitors from the United Kingdom and Ireland (13.2%) and North America (7.8%).

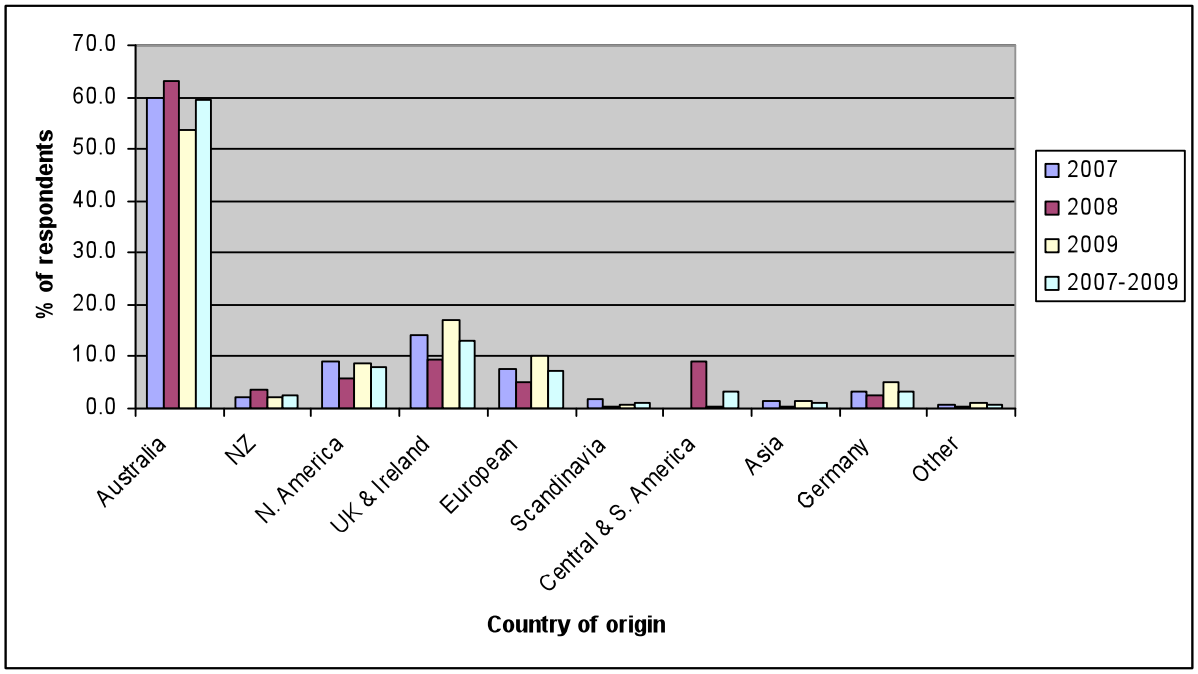

Figure 5: Origin of respondents (as percentages of 2007, 2008, 2009 and for the 2007–2009 survey period).

Of the 54.9% of domestic visitors who visited this region, almost two-thirds originated from both New South Wales (30.61%) and Victoria (28.84%). Queensland visitors totalled 23.91% (Figure).

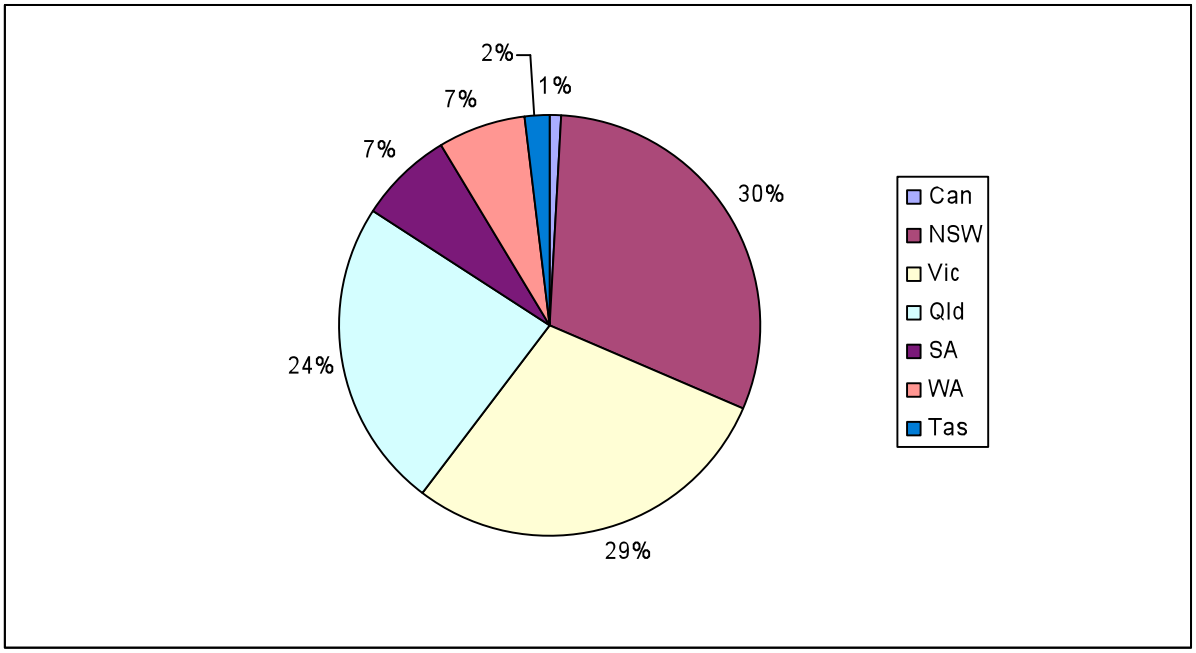

Figure 6: State of origin of respondents (as percentages of the 2007–2009 survey period).

Occupation (n= 3356)

The largest occupation categories of respondents in the 2007–2009 survey period were professionals (27.2%) followed by retirees/semi-retirees (15.4%) and self-employed (10.1%). Overall, the results over the three years indicate a relatively stable pattern of respondents based on occupation, with the exception of professionals.

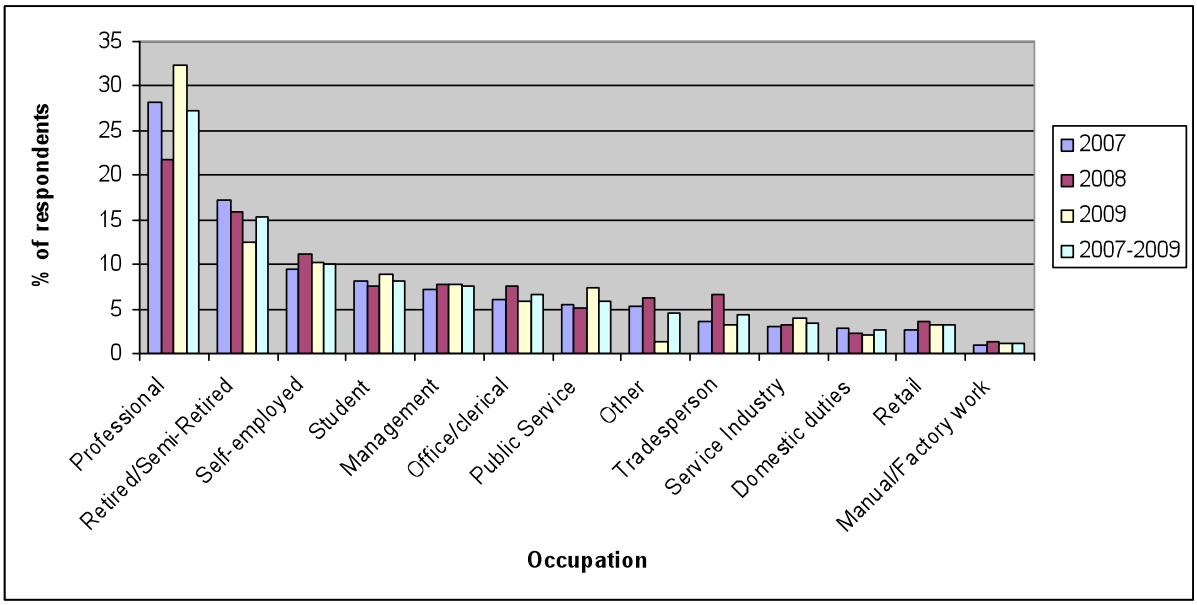

Figure 7: Occupation of respondents (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Table 1 compares the occupations of domestic and international respondents for 2009 and the 2007–2009 survey period. The composition is generally consistent over the 2007–2009 survey period for both domestic and international visitors, with the exception of students (4.1% domestic and 13.9% international) and retired/semi-retired respondents (17.4% domestic and 12.5% international). Professionals are the largest visitor segment based on occupation followed by semi-retired, self-employed and students.

Table 1: Comparison of domestic and international respondents' occupations for the year 2009 and the 2007-2009 survey period.

Occupation	2009		2007–2009 period	
	Domestic visitors (%)	International visitors (%)	Domestic visitors (%)	International visitors (%)
Professional	**33.7**	**31.2**	**28.1**	**26.5**
Retired/semi-retired	**14.4**	**9.8**	**17.4**	**12.5**
Self-employed	**11.9**	8.7	**10.7**	**9.5**
Student	3.1	**15.1**	4.1	**13.9**
Management	6.2	**9.8**	**7.2**	8.1
Office–clerical	6.4	5.3	6.5	6.5
Public Service	**6.6**	8	5.4	6.7
Other	0.8	2	4.1	4.8
Tradesperson	3.9	2.4	4.8	3.8
Service industry	4.3	3.5	3.8	2.8
Domestic duties	3.3	0.4	3.3	1.2
Retail	4.1	2.4	3.8	2.1
Manual/factory work	1.1	1.4	0.8	1.6

Age of respondents (n= 3342)

For the 2007–2009 survey period, the 20–39 year age group made up nearly half (43.6%) of all rainforest respondents. The largest annual variation occurred in the 20–29 year age group.

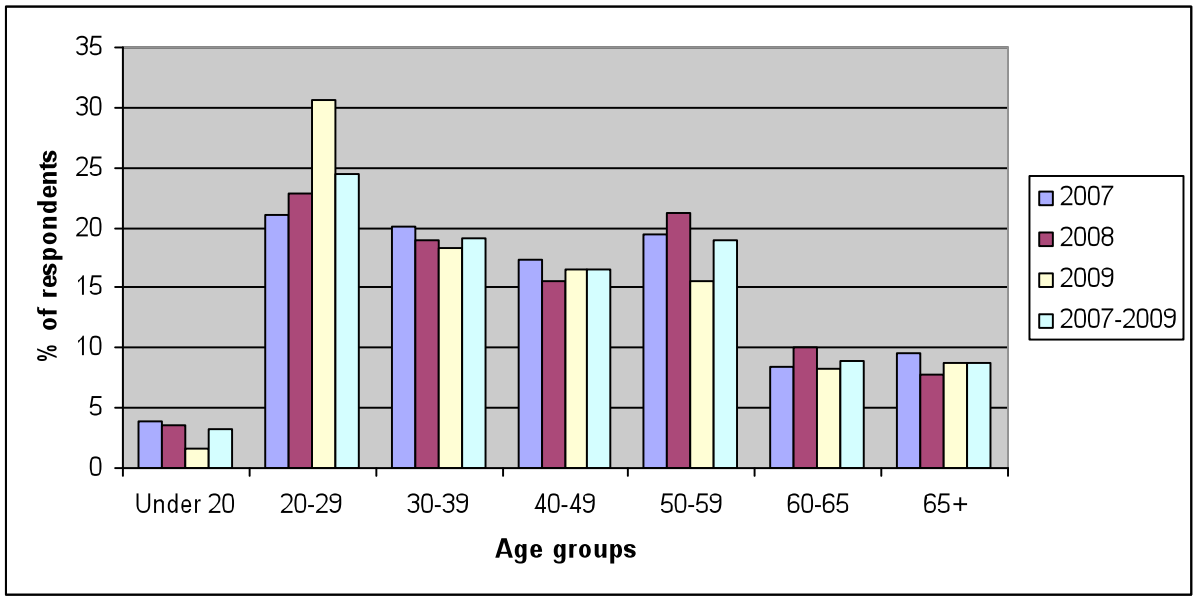

Figure 8: Age of respondents (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Table 2 illustrates the main difference between domestic and international respondents for the 2007–2009 survey periods. In the 2007–2009 survey period, the 20–29 year age group, constituted 19.2% of all domestic respondents and 31.8% of all international respondents. Based on these findings it is apparent that the 20-29 years age group constitutes the largest age based segment for both domestic and international respondents.

Table 2: Comparison of age groups of respondents for the 2007-2009 survey period of domestic and international visitors.

Age group	2007–2009 sample period	
	Domestic visitors (%)	International visitors (%)
Under 20 yrs	2.7	4
20–29 yrs	19.2	**31.8**
30–39 yrs	**20.5**	17.9
40–49 yrs	17.5	15.5
50–59 yrs	20.3	16.8
60–65 yrs	10	7.2
Over 65 yrs	9.8	6.8

Travel party

Survey results for 2007, 2008 and 2009 reveal that over half of the respondents were couples (55.8%, 52.7% and 50.6% respectively) and 53.4% for the 2007-2009 survey period (Figure). Visiting friends accounted for around 16% in each year of the survey (15.7% in 2007; 15.6% in 2008; 18.5% in 2009; 15.7% in the 2007–2009 survey period) followed closely by families travelling with children (13.6% in 2007; 10.3% in 2008; 11.7% in 2009; 12.1% in the 2009 survey period). International respondents were less likely to travel with friends (13.1%) than domestic visitors (24.3%) (Table 3).

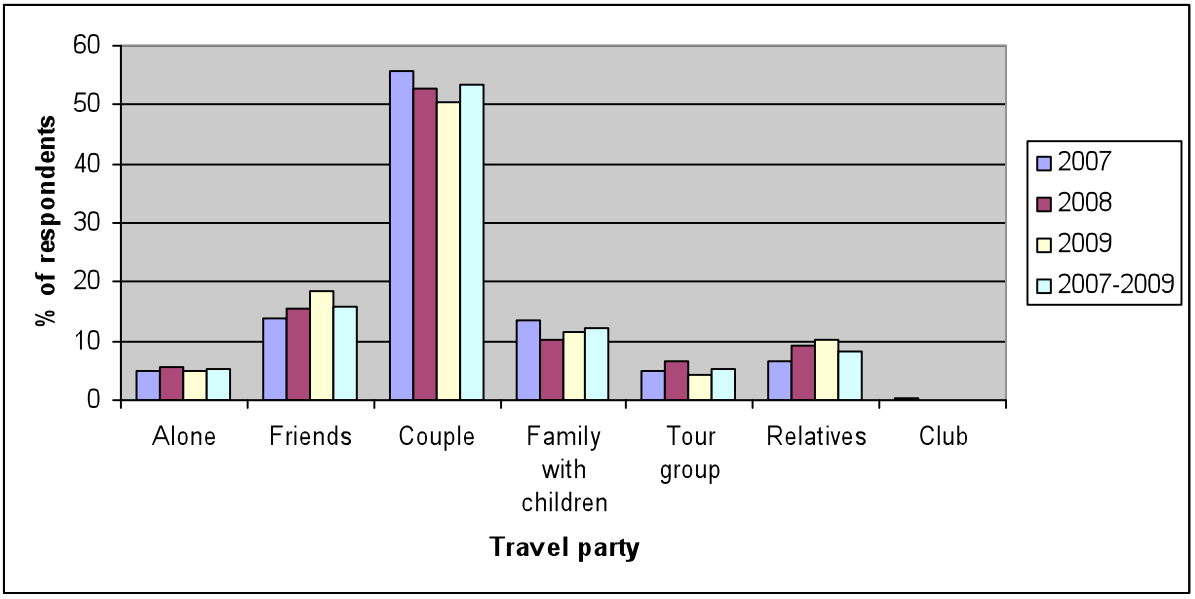

Figure 9: Travel party of respondents (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Table 3: Comparison of chosen travel parties of domestic and international respondents for the 2007–2009 survey period.

Travel Party	2007–2009 period	
	Domestic visitors (%)	International visitors (%)
Alone	7.5	3.5
Friends	18.7	13.2
Couple	49.6	56.4
Family with children	11.9	12.2
Tour group	4.8	5.4
Relatives	7.4	9.1
Club	0.1	0.2

First visit and length of stay (n= 3384)

In the 2007–2009 survey period, 64.3% of respondents were first-time visitors to the rainforest (Figure 10). Of the respondents who had previously visited the region (35.7%), the mean number of past visits to the region for the 2007–2009 survey period was four. The 2007–2009 mean average was 8.48 nights spent holidaying in the region.

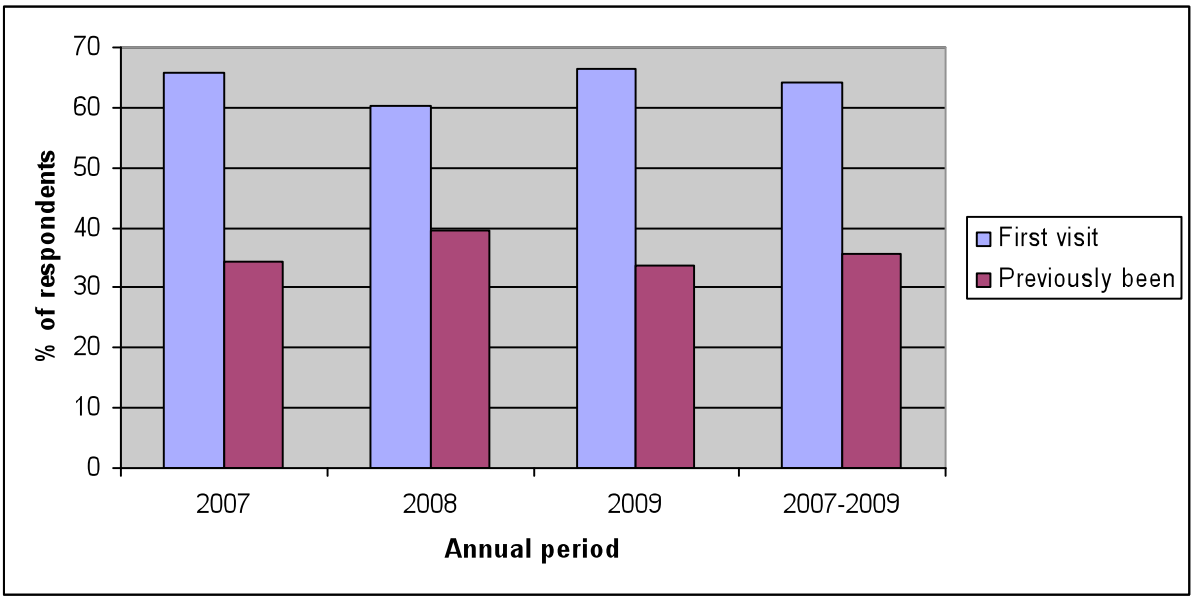

Figure 10: Percentage of respondents who were on their first visit to North Queensland (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Results outlined in Table 4 show that in the 2007–2009 period, 49.2% of domestic respondents were on their first visit to TNQ. In the same period, 86.0% of international respondents were on their first visit to the region.

Table 4: Comparison of first time and previous visits of domestic and international respondents in the 2007–2009 survey period.

	2007–2009 survey period	
	Domestic visitors (%)	**International visitors (%)**
First visit	49.2	86.0
Previously visited	50.8	14.0

Accommodation (n= 3284)

The accommodation types used by respondents during the 2007–2009 survey period were resorts (24.2%), followed by hotels/motels (23.9%) and holiday apartments/units (20.5%). These results were similar to the 2007 and 2008 results (Figure 11).

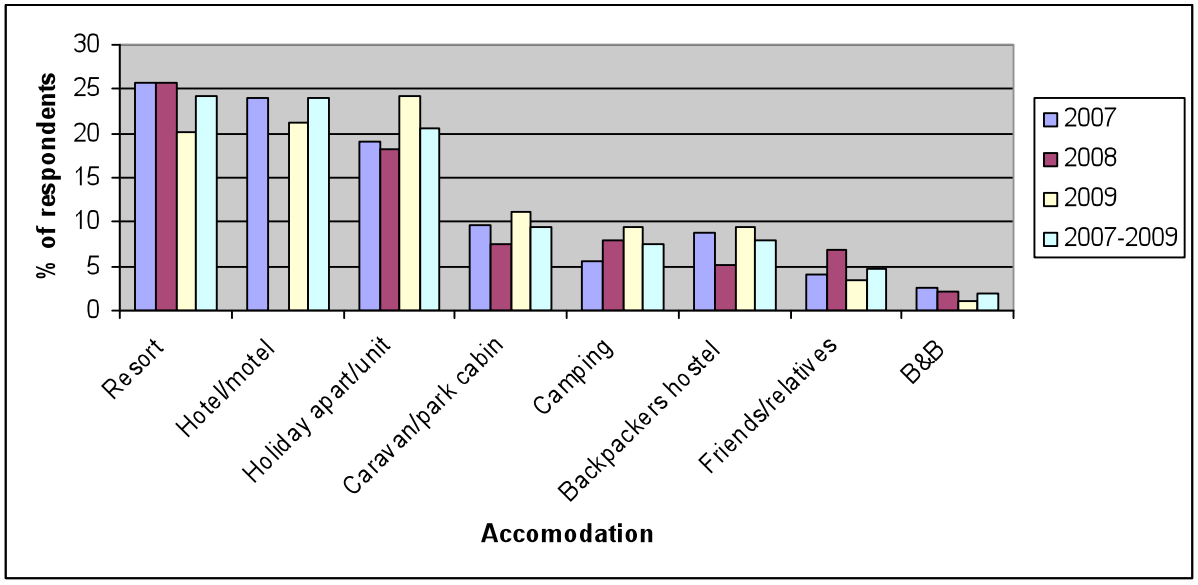

Figure 11: Chosen accommodation type for respondents (as percentages for 2007, 2008, 2009 and the 2007–2009 survey period).

Apartments (29.7%) followed by resorts (28.9%) were the most popular types of accommodation with domestic respondents for the survey period, while international respondents preferred hotel/motel style accommodation (24.1%), followed by holiday apartments/units (18.6%) and backpacker hostels (17.1%) (Table 5).

Table 5: Comparison of choice of accommodation for domestic and international respondents (2007–2009 survey period).

Accommodation type	2007–2009 survey period	
	Domestic visitors (%)	International visitors (%)
Resort	28.9	10.6
Hotel/motel	18.4	**24.1**
Holiday apart/unit	**29.7**	18.6
Caravan/park cabin	10.2	12.4
Camping	6.1	12.9
Backpackers hostel	2.3	17.1
Friends/relatives	3.6	3.2
B&B	0.8	1.1

Motivations and information sources

Motivations (n= 3190)

Respondents were asked about the importance of a number of motivations for visiting the region. A five point Likert scale was used where 1 = not at all important and 5 = very important. The following results are presented as a mean and summarized in Figure . For the 2007–2009 survey period the most important motives were visiting the rainforest (m=4.32)

followed closely by the Great Barrier Reef with a mean value of 4.29. These results highlight the role that both World Heritage Areas play in attracting visitors to the region.

Other significant motives for the 2007–2009 survey period included *experiencing the natural environment* (m=4.10), *seeing wildlife* (m=3.96) and *rest and relaxation* (m=4.08). Motives that were not seen as important included *meeting new people* (m=2.96) followed by *visiting friends and relatives* (m=2.49).

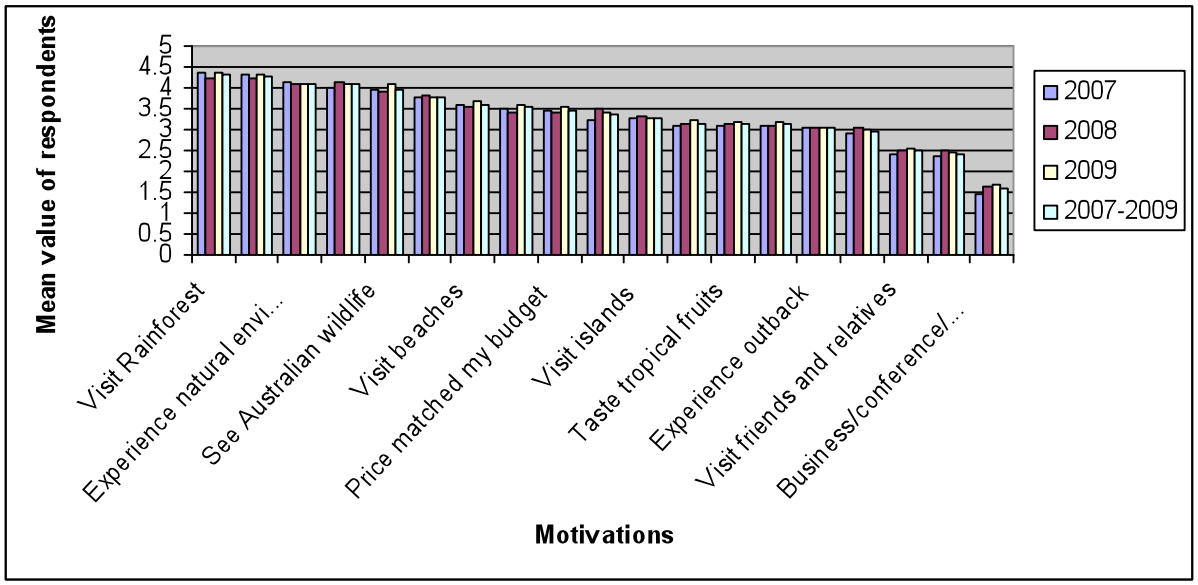

Figure 12: Respondents' motivations for visiting North Queensland (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Comparing domestic and international visitor motivations, international respondents were more interested in the destination's natural features – including the Great Barrier Reef, Wet Tropics rainforests, wildlife, snorkelling and diving, beaches, islands, adventure activities, and the outback than domestic visitors (Table 6). For international visitors, the Great Barrier Reef was a slightly more important motivation than the rainforest for visiting the region.

Table 6: Comparison of domestic and international respondents' motivations for visiting North Queensland in the 2007–2009 survey period.

Motivations	2007–2009 survey period	
	Domestic visitors	International visitors
Visit rainforest	**4.32**	**4.33**
Visit Great Barrier Reef	**4.07**	**4.6**
Experience natural environment	2.92	4.06
Rest and relax	**4.29**	3.8
See Australian wildlife	3.71	**4.31**
Climate	3.86	3.65
Visit beaches	3.54	3.67
Snorkelling and diving	3.37	3.82
Price matched my budget	3.55	3.35

Spend time with my family	3.51	3.15
Visit islands	3.18	3.36
Experience Aboriginal culture	2.92	3.47
Taste tropical fruits	3.11	3.16
Adventure activities	3.00	3.27
Experience outback	2.86	3.3
Meet new people	2.84	3.13
Visit friends and relatives	2.44	2.54
Go shopping	2.45	2.4
Business/conference/meeting	1.58	1.56

The most significant finding of this element of the survey is the consistent ranking of the top seven motives over a multi-year time frame. It is also apparent that price is not a major factor. Surprisingly, shopping and outback activities did not have a high ranking while 'tasting tropical fruits', an activity that is not promoted in the destination's marketing collateral, was given a ranking that shows a growing level of interest by respondents.

Results for 2009 and the 2007–2009 survey period were similar in terms of visitor rankings (Table 7) and for all years, *visiting friends and relatives, go shopping* and *business/conference/meeting* were the least important motivations.

Table 7: The rank for each motivation in 2007, 2008, 2009 and the 2007–2009 survey period.

Rank	2007	2008	2009	2007–2009 survey period
1	Visit the rainforests	Visit the rainforests	Visit Rainforest	Visit Rainforest
2	Visit the Great Barrier Reef	Visit the Great Barrier Reef	Visit Great Barrier Reef	Visit Great Barrier Reef
3	Experience the natural environment	Rest and relaxation	Experience natural environment	Experience natural environment
4	Rest and relaxation	Experience the natural environment	Rest and relax	Rest and relax
5	See Australian wildlife	See Australian wildlife	See Australian wildlife	See Australian wildlife
6	Climate	Climate	Climate	Climate
7	Visit the beaches	Visit the beaches	Visit beaches	Visit beaches
8	Diving	Spend time with family	Snorkelling and diving	Snorkelling and diving
9	The price matched my budget	Diving	Price matched my budget	Price matched my budget
10	Visit the islands	The price matched my budget	Spend time with my family	Spend time with my family
11	Spend time with family	Visit the islands	Visit islands	Visit islands
12	Taste tropical fruits	Taste tropical fruits	Experience Aboriginal culture	Experience Aboriginal culture
13	Adventure	Experience Aboriginal culture	Taste tropical fruits	Taste tropical fruits
14	Experience Aboriginal culture	Adventure	Adventure activities	Adventure activities
15	Experience the 'Outback'	Meet new people	Experience outback	Experience outback
16	Meet new people	Experience the 'Outback'	Meet new people	Meet new people

17	Visiting friends and relatives	Visiting friends and relatives	Visit friends and relatives	Visit friends and relatives
18	Go shopping	Go shopping	Go shopping	Go shopping
19	Business / conference / meeting	Business / conference / meeting	Business / conference / meeting	Business / conference / meeting

Information sources (n= 3384)

For the 2007–2009 survey period, 40.3% of respondents indicated that their major source of information about the region was friends and relatives. This result was consistent across the survey period. The other information sources that were significant included the internet, guidebooks, previous visits and travel agents (Figure).

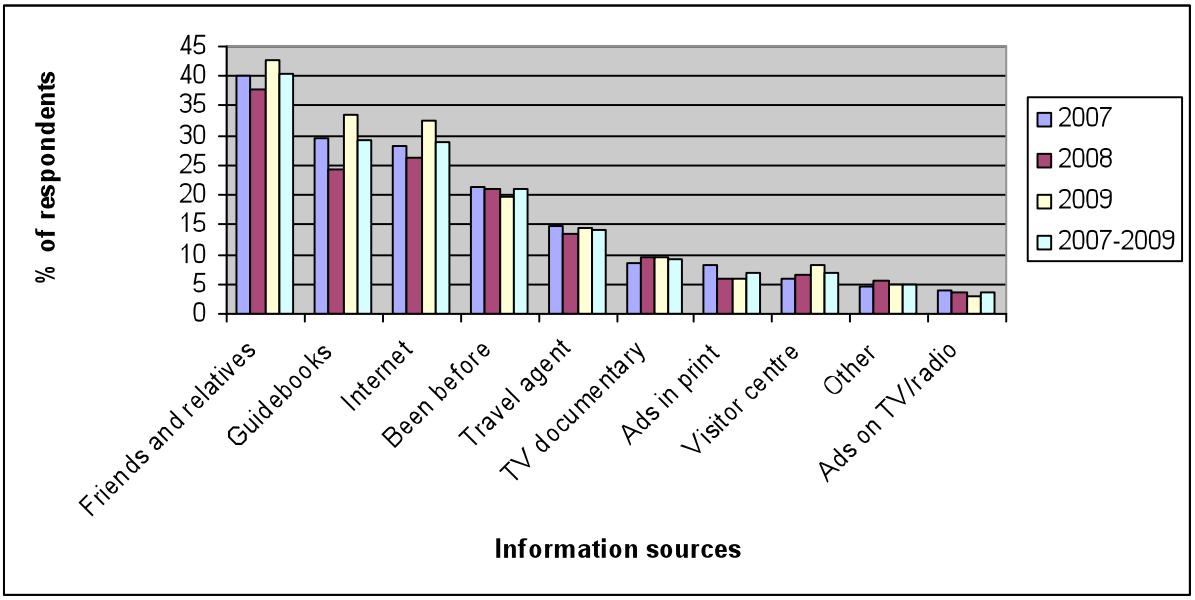

Figure 13: Information sources used by respondents (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Comparing information sources used by domestic and international respondents, international visitors had a high propensity to use guidebooks, the internet, travel agents and visitor centres for information compared with domestic visitors (Table 8). This highlights the need for the region's tourism industry to supply regular information to these information sources.

Table 8: Comparison of domestic and international respondents' information sources for the 2007–2009 survey period.

Information sources	2007–2009 survey period	
	Domestic visitors (%)	International visitors (%)
Friends and relatives	**40.5**	**40.3**
Guidebooks	20	**42.4**
Internet	**28**	**31.2**
Been before	**30**	8.2
Travel agent	9	21.9

TV documentary	11	6.5
Ads in print	7.9	5.5
Visitor centre	5.6	8.6
Other	6.1	3.4
Ads on TV/radio	5	1.3
Friends and relatives	40.5	40.3

Rainforest issues

Rainforest locations visited and length of stay

The key hotspots for experiencing the rainforests of North Queensland during the 2007–2009 survey period were Mossman Gorge (53.4%), Daintree (51.5%), Kuranda (47.7%) and Cape Tribulation (35.4%) (Figure 14).

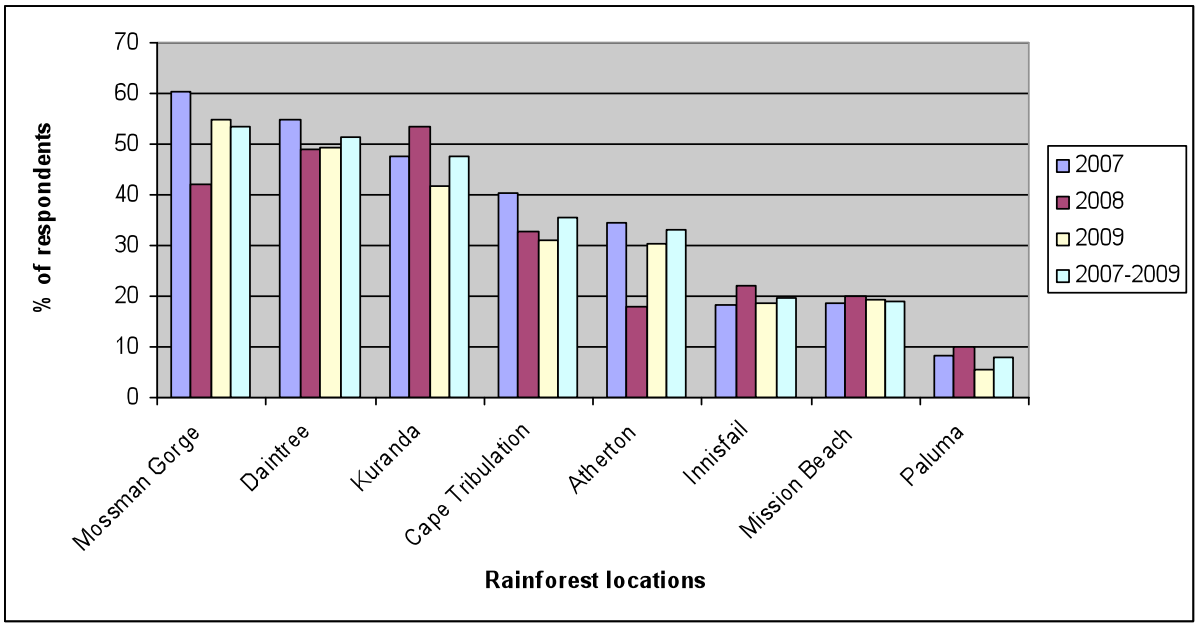

Figure 14. Rainforest locations visited by respondents in 2007, 2008, 2009 and the 2007–2009 survey period.

Comparing domestic and international visitors for the 2007–2009 survey period and the rainforest locations they intended to visit, responses indicate an intention to visit that may not have been realized (Table 9). Cape Tribulation was the most important location followed by the Daintree and Atherton.

Table 9: Comparison of domestic and international respondents key rainforest locations they intended to visit (2007–2009 survey period).

Departure location	2007–2009 survey period	
	Domestic visitors (%)	International visitors (%)
Mossman Gorge	18.2	19.7
Daintree	23.3	23.9
Kuranda	20.9	22.9

Cape Tribulation	29.7	30.9
Atherton	20.1	20.4
Innisfail	9.8	12.3
Mission Beach	13.6	13.3
Paluma	9	10.4
Mossman Gorge	18.2	19.7

Importance of visiting rainforests and knowledge (n=1890)

The survey posed a question on the importance of visiting the Wet Tropics rainforests while staying in the region. Respondents were able to reply on a scale of 1 (Not at all important) through to 5 (Very important). The mean for the 2007–2009 survey period was 4.19. There was very little difference between the mean for domestic respondents (4.21) and international respondents (4.16).

Respondents were also asked if they would have visited the Wet Tropics if they had known that it was *not* World Heritage listed. For the 2007–2009 survey period, 93.3% of respondents indicated that they would have visited the area even if it was not a World Heritage site. The responses for domestic and international respondents for the 2007–2009 survey period were similar (94.1% domestic and 92.2% international). These results indicate that the attraction of the forest as a unique ecosystem appears to be more important than the brands (National Park, World Heritage Area) used to describe it.

Respondents were also asked if they knew prior to their visit to Cairns that the Wet Tropics Rainforests was World Heritage listed. For the 2007–2009 survey period, 64.7% indicated they knew it was World Heritage listed before their visit. King and Prideaux (2010) analysed visitors' knowledge of the region's World Heritage status prior to their visit and found the level of knowledge was much lower.

Just over three-quarters (77.3%) of *domestic* visitors reported knowing that the rainforest was World Heritage listed, compared with less than half of international visitors (47.0%).

Respondents were also asked about how important they believed it is for them to visit national parks. The question used a Likert scale where 1 indicated "Not at all important" and 5 indicated "Very important". In the 2007–2009 survey period the mean for this question was 3.86 (3.82 for domestic respondents and 3.91 for international respondents), indicating that for most people visiting national parks is important but not very important.

Rainforest activities (n=1953)

The survey also posed a question about respondents' participation in a number of rainforest activities (Figure Results were relatively consistent throughout the 2007–2009 survey period for most activities. Walking was the most popular activity followed by viewing the scenery, photography and viewing wildlife. A previous study based on a series of questions included in the 2007 version of the Rainforest Survey (McNamara and Prideaux 2011a)examined the demand for walking activities in the Wet Tropics rainforest and found a high level of demand for short walks and significant demand for unguided one day walks.

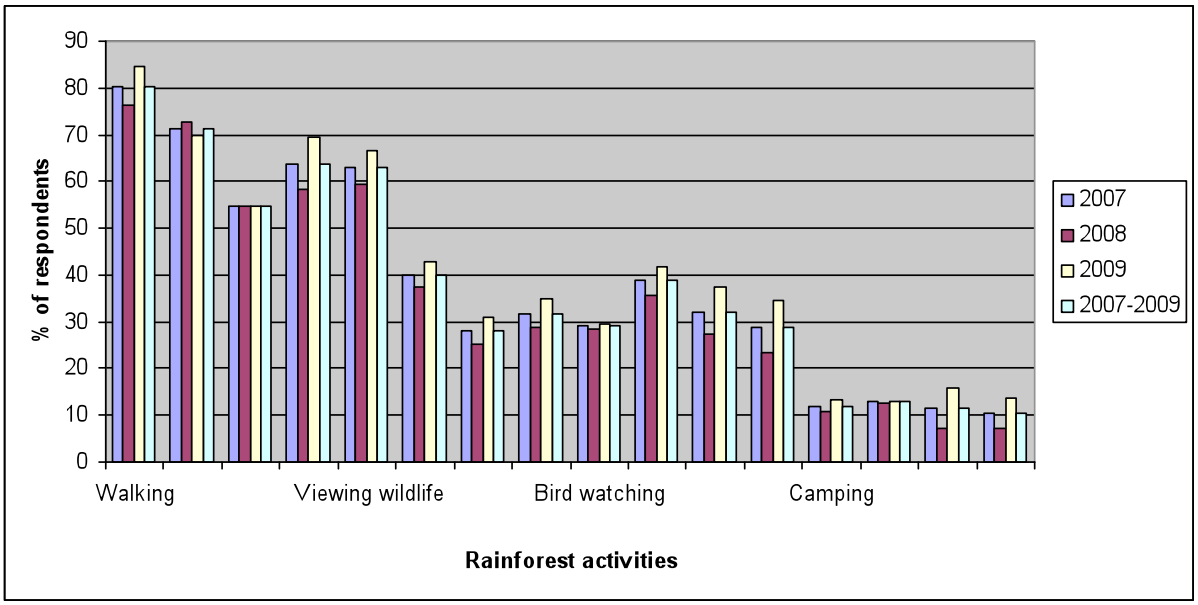

Figure 15: Respondents' levels of interest in rainforest activities as percentages of 2007, 2008, 2009 and the 2007–2009 survey period.

Domestic respondents reported a slightly higher level of interest in most of the activities listed in Table 10 compared with international respondents. The exceptions were photography, visiting information centres, guided tours and bird watching.

Table 10: Comparison of domestic and international respondents' interests in rainforest activities for the 2007–2009 survey period.

Rainforest activities	2007–2009 survey period	
	Domestic visitors (%)	International visitors (%)
Walking	82.4	78.0
Viewing scenery	72.4	70.2
General relaxation	60.6	47.0
Filming/photography	60.7	68.4
Viewing wildlife	60.7	66.7
Visiting information centres	37.8	43.9
Reading site interpretation	26.7	30.1
Guided tour	28.8	36.2
Bird watching	26.7	32.5
Swimming	38.2	40.0
Hiking	32.2	32.5
Socialising	30.8	26.3
Camping	10.7	13.4
Four-wheel driving	12.2	13.8
Rafting	12.8	9.60

Rainforest interpretation (n=1677)

This section outlines the responses to a number of attitudinal statements about on-site environmental and cultural interpretation. Six statements were posed to respondents concerning different facets of their experience. Respondents were asked to comment on these statements using a 5 point Likert scale where 1 indicated 'Strongly disagree' and 5 indicated 'Strongly agree'.

The results clearly illustrate that on-site environmental and cultural information was interesting and clear and had a positive impact on site behaviour and attitude. In most cases there was little difference between international respondents and domestic respondents (Table 11). The degree to which information of this type is translated into changes in behaviour and actions may not be as strong as indicated in the results in Figure 16. Previous research in the Wet Tropics rainforest (McNamara and Prideaux 2010b) indicates that positive responses to questions of this nature may reflect a degree of 'social desirability' bias.

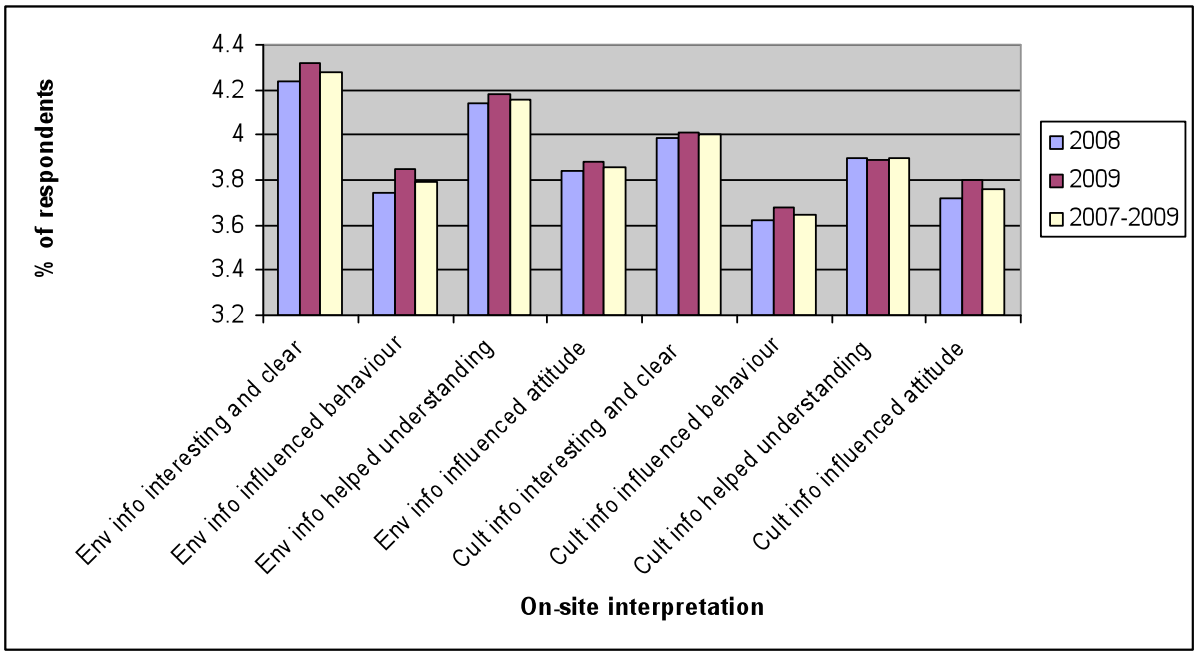

Figure 2: Impressions of respondents to attitudinal statements concerning environmental and cultural interpretation (as mean values of 2008, 2009 and the 2007–2009 survey period).

Table 11: Comparison of domestic and international respondents' attitudes to on-site interpretation for the 2007-2009 survey period.

On-site interpretation	2007–2009 survey period	
	Domestic visitors (%)	International visitors (%)
Environmental information was interesting and clear	4.21	4.33
Environment information influenced behaviour	3.74	3.84
Environment information helped understanding	4.11	4.19
Environment information influenced attitude	3.78	3.91
Culture information interesting and clear	3.95	4.04
Culture information influenced behaviour	3.58	3.70
Culture information helped understanding	3.84	3.93
Culture information influenced attitude	3.71	3.79

Respondents' perceptions of threats to the rainforest (n= 510)

Using a scale of 1 (non-threatening) to 5 (severely threatening), respondents were asked to give their opinions on the seriousness of a number of factors they considered were threats to the rainforest. The results in 2009 showed that domestic respondents were mainly concerned about weeds, feral animals and pathogens (m=3.91) followed closely by vegetation clearing (m=3.89) and urban development and pollution. International respondents considered vegetation clearing (m=3.89) and urban development and pollution (m=3.85) to be the biggest threats (Figure 3).

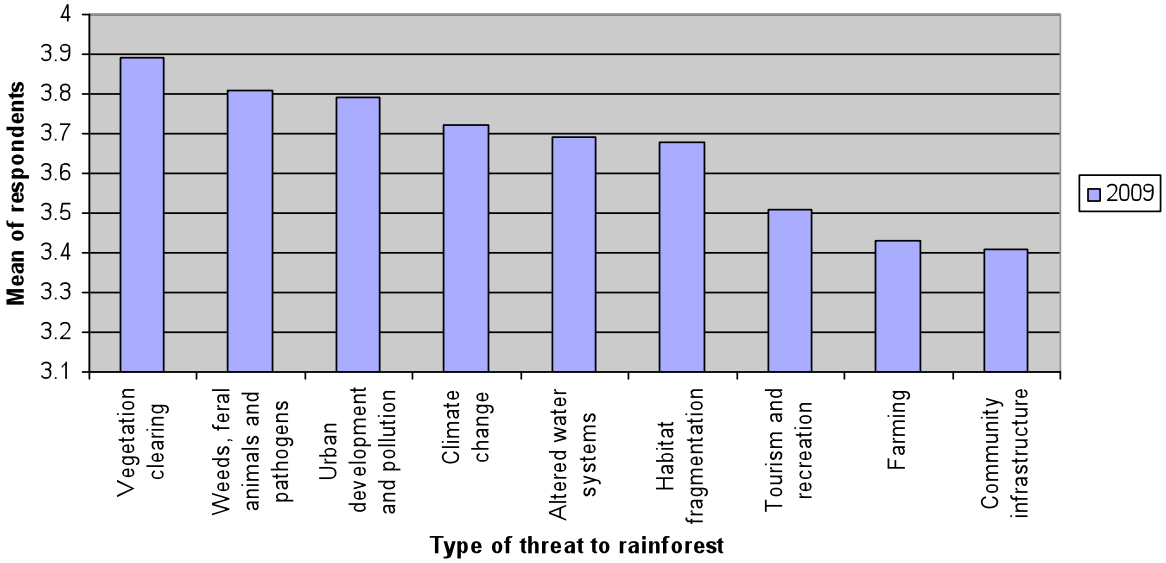

Figure 3: Respondents' mean rating of rainforest threats in 2009.

Climate change was ranked as the fourth most significant threat with a mean of 3.72 (domestic m=3.67 and international m=3.78), indicating that most respondents see it as a threat although not as important as vegetation clearing and urban development, at least in the near future.

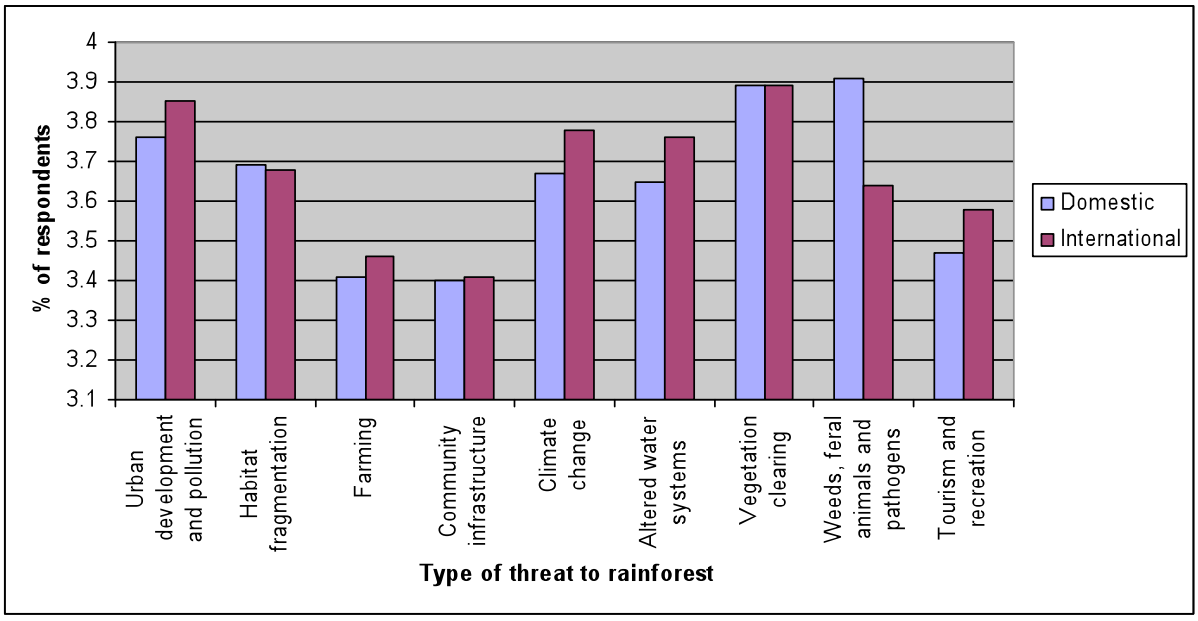

Figure 4: Domestic and international respondents' mean rating of rainforest threats in 2009.

Overseas rainforests (top five) visited by domestic and international respondents (n=2506)

The survey asked respondents for details of previous visits to rainforests. Almost one-third (32.9%) of domestic respondents for the 2007–2009 survey period indicated that they had visited overseas rainforests. Almost one quarter had visited rainforests in Thailand (8.41%), New Zealand (7.16%) and Malaysia (7.15%) (Figure 19).

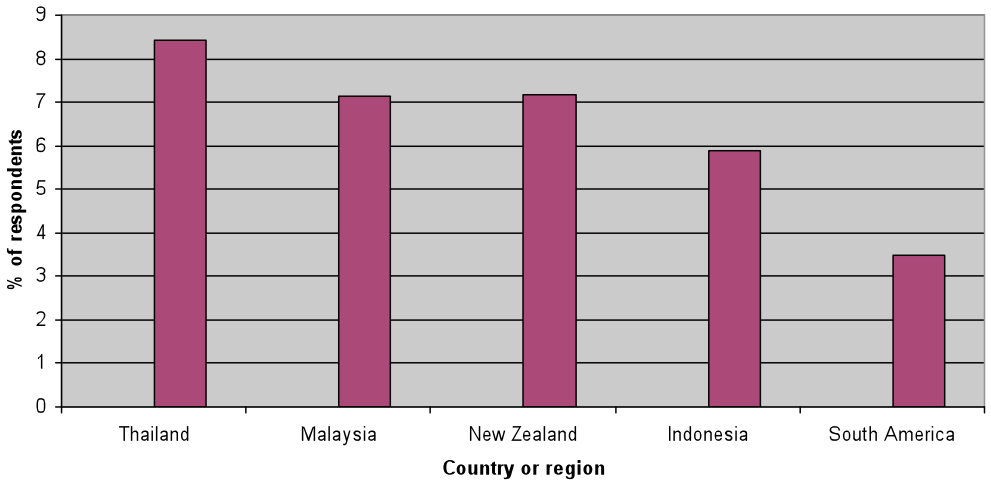

Figure 5: Overseas rainforests visited by domestic respondents (2007–July 2009 survey period).

In the same period (2007–July 2009) international respondents visiting TNQ reported that they had visited rainforests in South America (7.54%) followed by New Zealand (6.77%), Malaysia (6.38%), Central America and Mexico (5.9%) and Thailand (3.29%) (Figure 20).

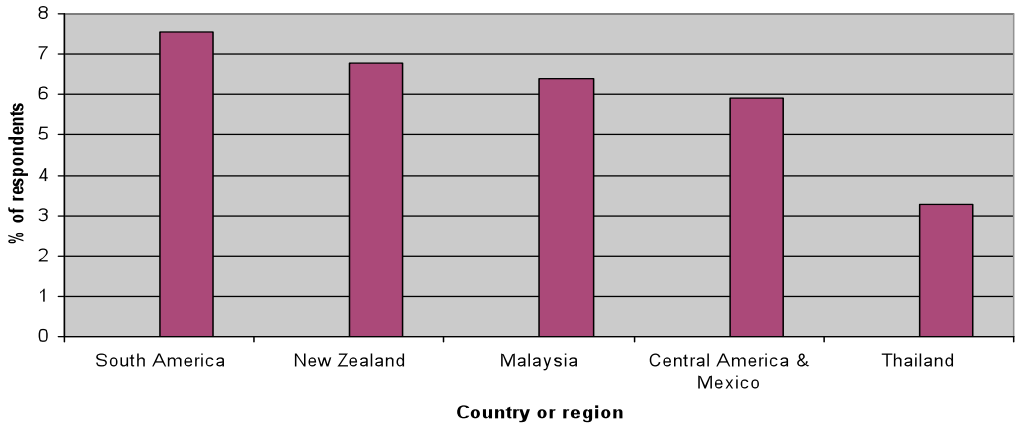

Figure 20: Overseas rainforests visited by international respondents (2007–July 2009 survey period).

Respondents' environmental practices (n=1963)

To investigate environmental practices, respondents were given a list of eight environmental practices and asked to indicate which activities they had participated in during the last 12 months. The most significant actions in order of importance across all nationalities were actions to reduce energy consumption at home, reduce waste and water consumption and considering environmental issues when voting (Table 12). While the importance of these practices was apparent across all nationalities surveyed, the level of participation varied widely. For example, 53.3% of Europeans reported participating in energy reduction practices at home while 74.4% of North American respondents reported participating in this environmental practice.

Table 12: Environmental practices engaged in by respondents.

Type of activity	Nationality of respondents				
	Australian (%)	New Zealand (%)	North America (%)	UK & Ireland (%)	Europe (%)
Worked in the environmental field	9.4	14.0	9.4	9.9	11.5
Modified home surrounds to include native plants	25.5	34.0	21.4	11.8	10.7
Reduced waste and water consumption at home	67.0	56.0	70.1	66.5	54.9
Encourage some else to change environment harming practices	28.8	22.0	44.4	27.4	18.9
Consider environmental issues when voting	32.4	38.0	47.9	30.2	26.2
Attend training in environmental management	6.8	4.0	4.3	8.0	4.1
Reduced energy consumption at home	67.0	72.0	74.4	67.0	53.3
Participated in local environmental issues	12.9	12.0	23.1	16.5	6.6
Worked in the environmental field	9.4	14.0	9.4	9.9	11.5

Respondents' overall trip satisfaction

Respondents were asked to rate the overall quality of their visit to the Wet Tropics rainforest using a scale of 1 ('Not at all satisfactory') to 10 ('Highly satisfactory'). The mean score for the 2007–2009 survey period was 8.39 (Figure). This result indicates a high and relatively consistent level of satisfaction across the three years of surveying. These results are consistent with the findings of visitor satisfaction with the rainforest for local residents (Carmody and Prideaux 2008) and international visitors (Carmody and Prideaux 2010).

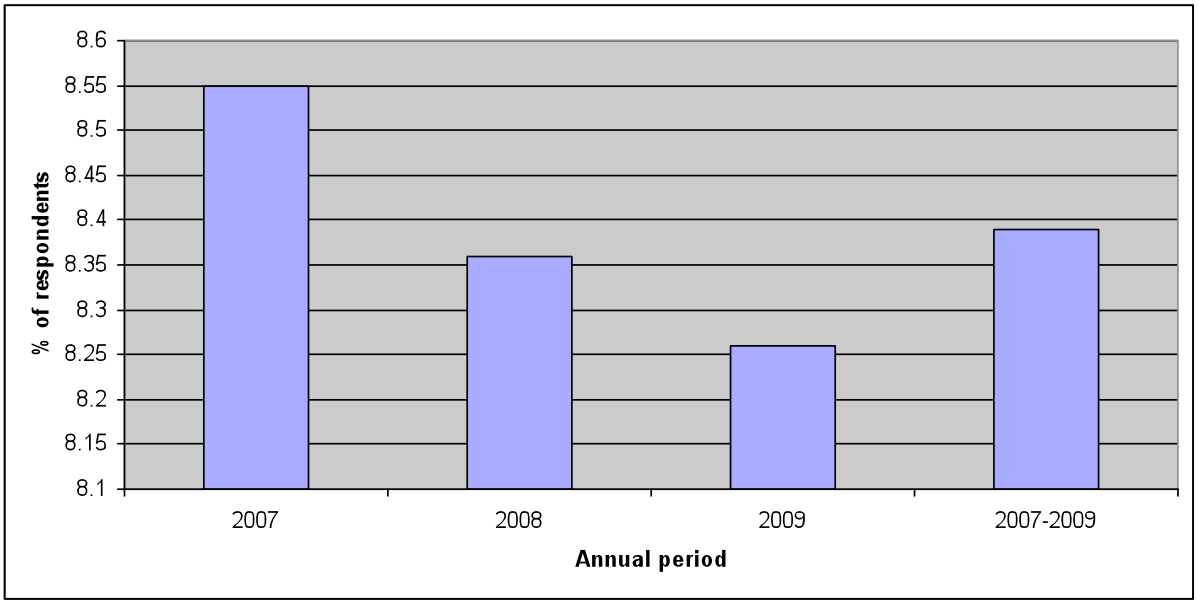

Figure 21: Satisfaction levels for domestic and international respondents who had visited the rainforest during their trip to North Queensland in 2007, 2008, 2009 and from the 2007–2009 survey period.

4.2 Cairns Airport visitor survey

The following discussion highlights significant findings of *Project 4.9.2 Sustainable nature based tourism: planning and management*. An objective of the project was to report on the sustainable use of rainforest resources by the tourism industry. For a more detailed analysis of the survey results see Sibtain and Prideaux (2010b).

The survey instrument contained a combination of questions on socio-demographics, motivations (using a Likert scale), behaviours, travel patterns and satisfaction. Responses were collected through a mix of closed ended, Likert-scale and open ended questions. Open-ended questions minimize interviewer bias that may signal how respondents should react and allowed respondents to give richer responses than are possible with closed questions (Altinay & Paraskevas 2008).

Information collected in the surveys includes visitors' socio-demographic characteristics, travel patterns, motivations, activities, alternative destinations considered, previous rainforest tourism experience and satisfaction, including measures of expectations, recommendations to others, and value for money.

Socio-demographics

Gender and origin of respondents (n = 4534)

For the 2007–2009 survey period, 57.3% of domestic respondents and 54.4% of international respondents were female. After domestic visitors, the second largest group of respondents was from the United Kingdom (UK) and Ireland, followed by North America and Europe (Figure 22).

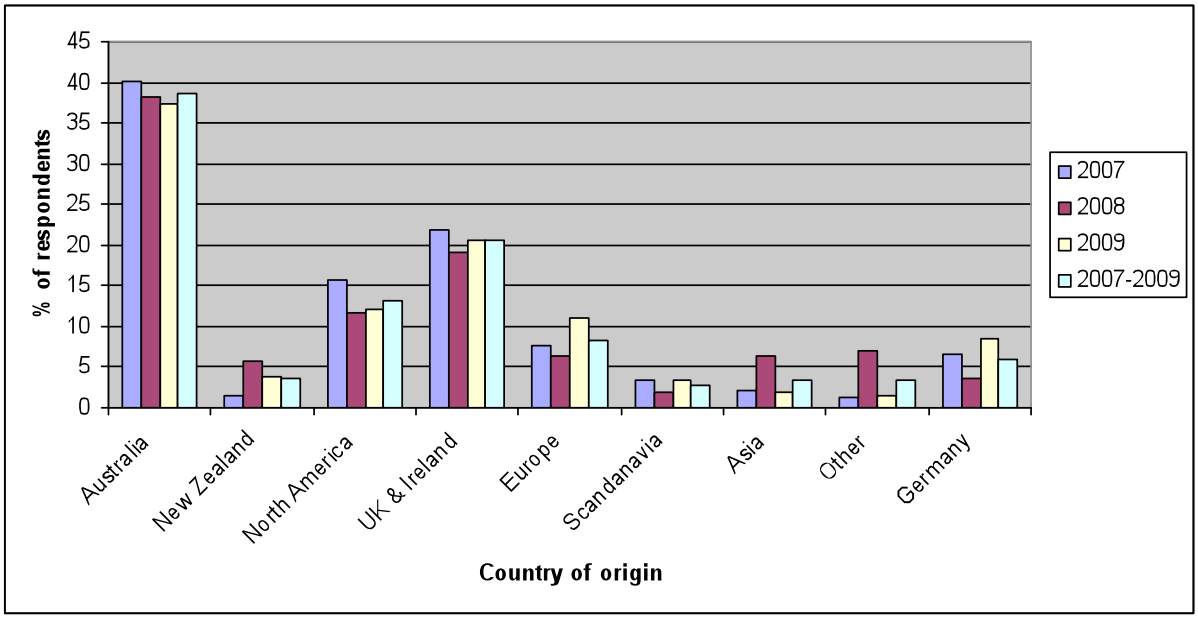

Figure 22: Origin of respondents (as percentages for 2007, 2008, 2009 and the 2007-2009 survey period).

Occupation (n = 4534)

By occupation, the largest group of respondents was professionals (23.5%), followed by students (16.8%) and retirees/semi-retirees (14.3%) (Figure 23).

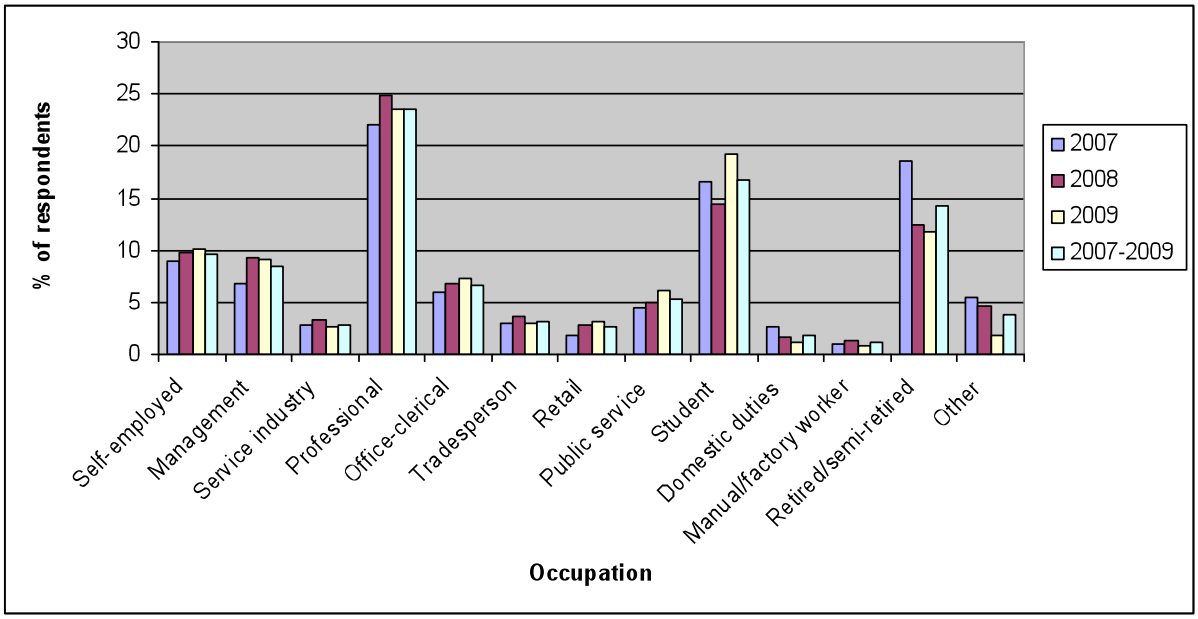

Figure 23: Occupation of respondents (as percentages of 2007, 2008, 2009 and the 2007-2009 survey period).

Age of Respondents (n =4533)

Figure presents the age composition of respondents in 2007, 2008, 2009 and for the 2007–2009 survey period. Combined, the 20–29 and 30–39 year age groups comprise 44% of the 2007–2009 survey period. The 60–65 and the 65+ groups together totalled 19.5% over the same period.

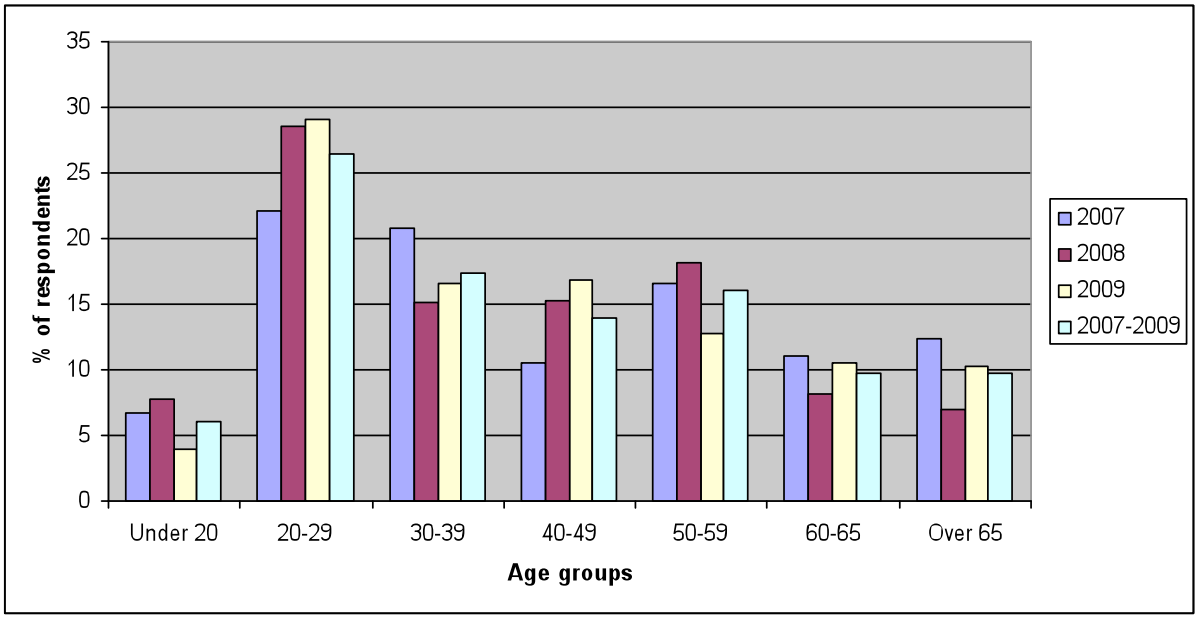

Figure 24: Age of respondents (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Travel party (n = 4362)

The largest travel party sector was couples who accounted for 42.6% of the 2007–2009 survey period; a rate which remained constant for each year of this survey (Figure 25). Following couples, the most significant travel party groups were respondents travelling alone (16.2%) and with friends (15.5%).

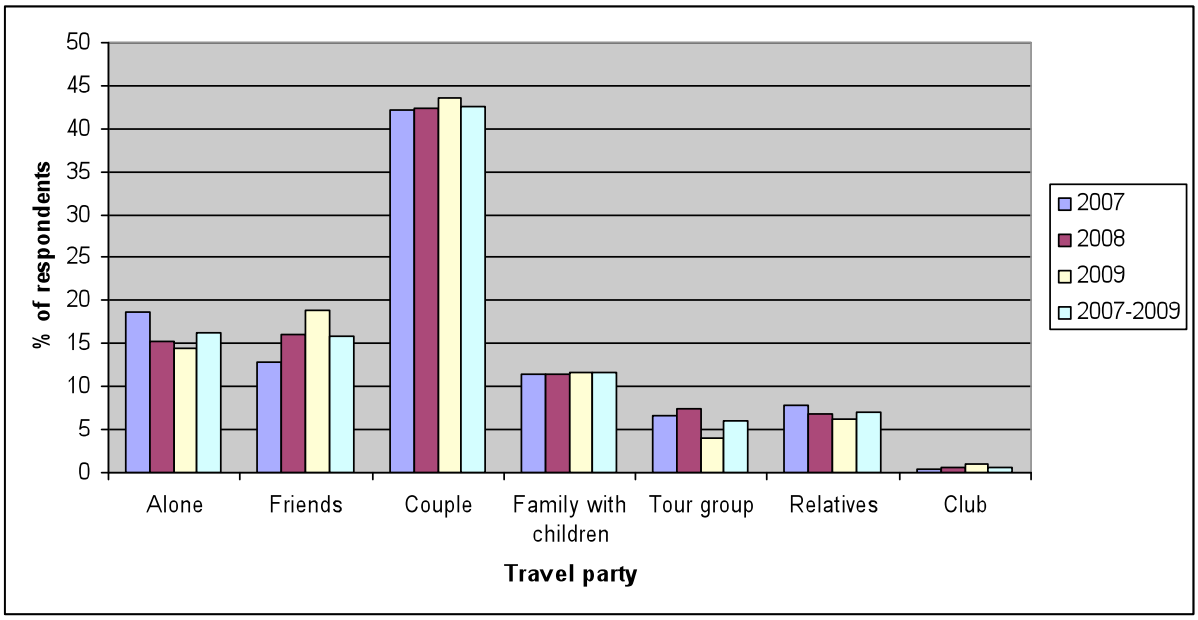

Figure 25: Travel party of visitors surveyed (as percentages of 2007, 2008, 2009 and the 2007-2009 survey period).

More domestic visitors travelled as couples than internationals during the 2007–2009 survey period. A similar pattern was identified with respondents travelling alone and travel parties consisting of a family with children in the 2007–2009 survey period. International travelers in both periods were more likely to travel with friends compared to domestic visitors.

First visit and length of stay (n = 4362)

During the 2007–2009 survey period, 66.6% of respondents were first-time visitors to North Queensland (Figure 26).

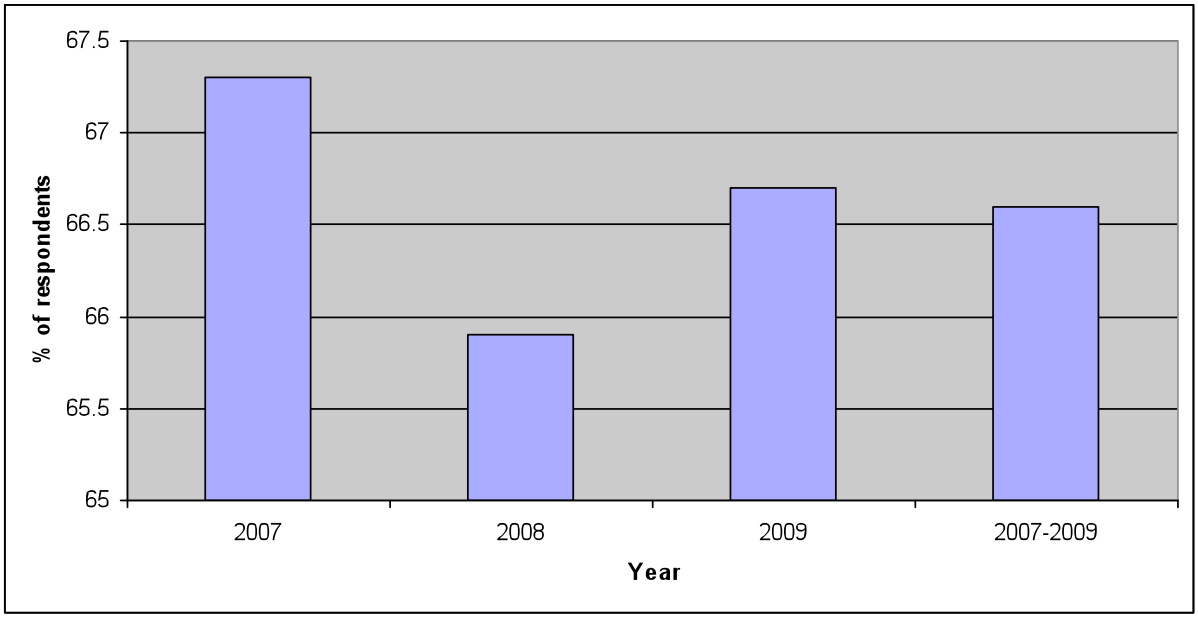

Figure 26: Percentage of respondents on their first visit to North Queensland (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Of the remaining 33.4% of respondents for the 2007-2009 survey period who had visited North Queensland on a previous occasion, 62.7% had visited the region up to three times previously.

For the 2009 survey period, the average length of nights spent by all respondents in Tropical North Queensland was 7.41. For domestic respondents the average length of stay was 7.31 nights and slightly more for international visitors (7.55 nights).

Motivations (n=4540)

The airport exit survey contained a question that listed a number of motivations for visiting North Queensland. Respondents were asked to rate the importance of each motivation on a scale from 1 (not at all important) to 5 (very important). Motives were based on the region's pull factors, that is the activities and attractions that differentiated it from its competitors in the minds of visitors. It is clear that for the survey period 2007–2009, visiting the Great Barrier Reef (mean = 4.26) and the rainforest (mean = 3.94) were among the most important motivations for visiting North Queensland. Other motivations that respondents considered to be important were seeing the natural environment (mean = 3.88) and wildlife (mean = 3.82) and rest and relaxation (mean = 3.98).

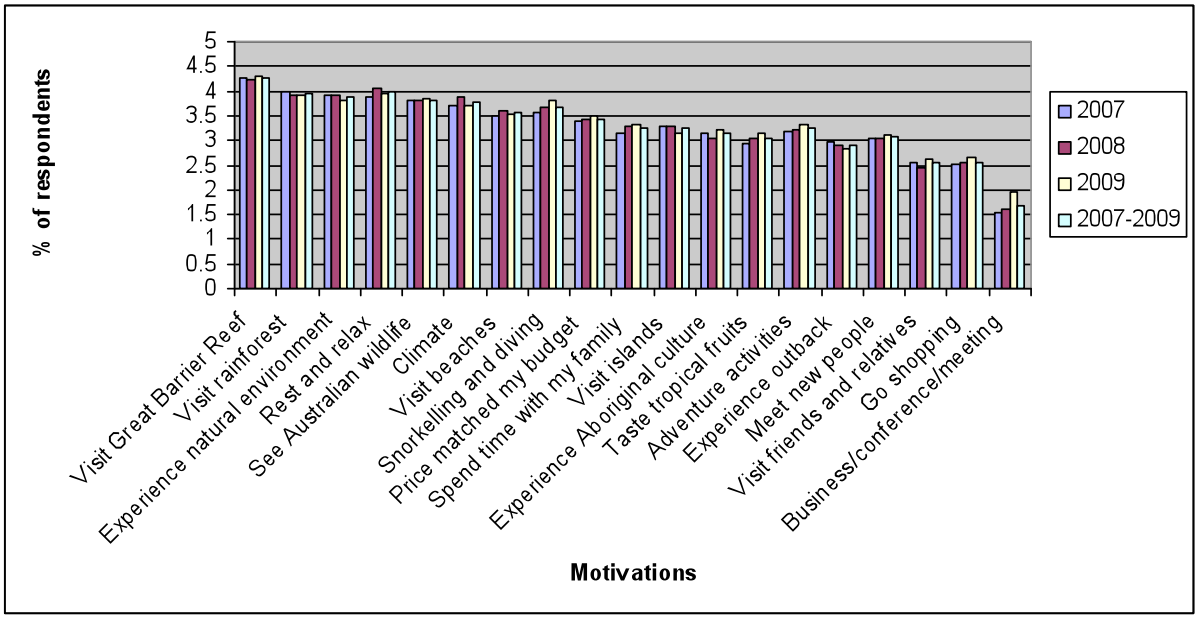

Figure 27: Respondents' motivations for visiting North Queensland (as percentages of 2007, 2008. 2009 and the 2007–2009 survey period).

A comparison of motivations between international and domestic respondents showed significant differences between the two groups (Table 13). The ranking of individual motives for domestic and international respondents is highlighted in Table 14.

Table 13: Comparison of domestic and international respondents' motivations for visiting North Queensland in the 2007–2009 survey period.

Motivations	2007-2009 survey period	
	Domestic (mean	International (mean)
Visit Rainforest	3.73	4.59
Visit Great Barrier Reef	3.71	4.09
Experience natural environment	3.77	3.96
Rest and relax	4.23	3.81
See Australian wildlife	3.27	4.16
Climate	3.86	3.72
Visit beaches	3.49	3.59
Snorkelling and diving	3.3	3.9
Price matched my budget	3.5	3.38
Spend time with my family	3.5	3.05
Visit islands	3.13	3.32
Experience Aboriginal culture	2.69	3.4
Taste tropical fruits	2.98	3.06
Adventure activities	2.99	3.39
Experience outback	2.83	3.12
Meet new people	2.83	3.21

Visit friends and relatives	2.69	2.44
Go shopping	2.54	2.56
Business/conference/meeting	1.81	1.59
Visit Rainforest	3.73	4.59
Visit Great Barrier Reef	3.71	4.09

Table 14 illustrates the overall rank for each motivation, followed by the ranking of each motivation disaggregated into domestic and international respondents. However, it is apparent that basing motivations for visiting the region only on the aggregated mean may be misleading. For example, for the aggregated data set, visiting the rainforest is the primary motive for all respondents but when the data set is disaggregated into domestic and international visitors the rainforest was ranked third by domestic respondents (m=3.73) but first by international respondents (m=4.59).

There were considerable differences in the ranking given to motivations by domestic and international visitors. The top seven motives for visiting the region during the 2007–2009 survey period for domestic visitors were: rest and relax (1), climate (2), experience the natural environment (3), visit the rainforest (4), visit the Great Barrier Reef (5), visit the beaches (6), 'price matched my budget' (7) and 'visit friends and relatives' (7). For international visitors the top seven motives were to visit the rainforest (1), see Australian wildlife (2), visit the Great Barrier Reef (3), experience the natural environment (4), snorkelling and diving (5), rest and relax (6) and climate (7).

Analysis of the remaining motives indicates that there is relatively strong interest by international visitors (m=3.4) in indigenous culture and adventure activities (m=3.39). One surprising finding was that strength of motivations was generally higher for international visitors than domestic visitors. For example, 'visit the rainforest' achieved a mean of 4.59 for internationals but only 3.73 for domestic visitors. Similarly, the mean for international visitors to visit the Great Barrier Reef was 4.09 compared to 3.71 for domestic visitors.

The size of the mean is a strong indication of the strength of attraction in the visitors' set of 'push' factors, that is the factors that encouraged them to visit the region. Where the mean falls below 4, a significant number of respondents give a neutral response of 3 on the 5-point likert scale. Where the mean is 4 or above, a significant number of respondents viewed the motive as important or very important.

Table 14: The rank for each travel motivation by the 2007–2009 survey period and by domestic and international visitors.

Rank	2007–2009 survey period	Domestic visitors surveyed	International visitors surveyed
1	Visit Great Barrier Reef	Rest and relax	Visit rainforest
2	Rest and relax	Climate	See Australian wildlife
3	Visit rainforest	Experience natural environment	Visit Great Barrier Reef
4	Experience natural environment	Visit rainforest	Experience natural environment
5	See Australian wildlife	Visit Great Barrier Reef	Snorkelling and diving
6	Climate	Price matched my budget	Rest and relax
7	Snorkelling and diving	Spend time with my family	Climate
8	Visit beaches	Visit beaches	Visit beaches
9	Price matched my budget	Snorkelling and diving	Experience Aboriginal culture
10	Spend time with my family	See Australian wildlife	Adventure activities
11	Visit islands	Visit islands	Price matched my budget

12	Adventure activities	Adventure activities	Visit islands
13	Experience Aboriginal culture	Taste tropical fruits	Meet new people
14	Meet new people	Experience outback	Experience outback
15	Taste tropical fruits	Meet new people	Taste tropical fruits
16	Experience outback	Experience Aboriginal culture	Spend time with my family
17	Go shopping	Visit friends and relatives	Go shopping
18	Visit friends and relatives	Go shopping	Visit friends and relatives
19	Business/conference/meeting	Business/conference/meeting	Business/conference/meeting

Rainforest Issues

Visits to rainforests of the Wet Tropics (n=4175)

During the 2007–2009 survey period, 76.1% of respondents reported visiting the Wet Tropics World Heritage rainforests as part of their trip to the region. The key hotspots for experiencing the rainforest included Kuranda, Daintree and Mossman Gorge (Figure .

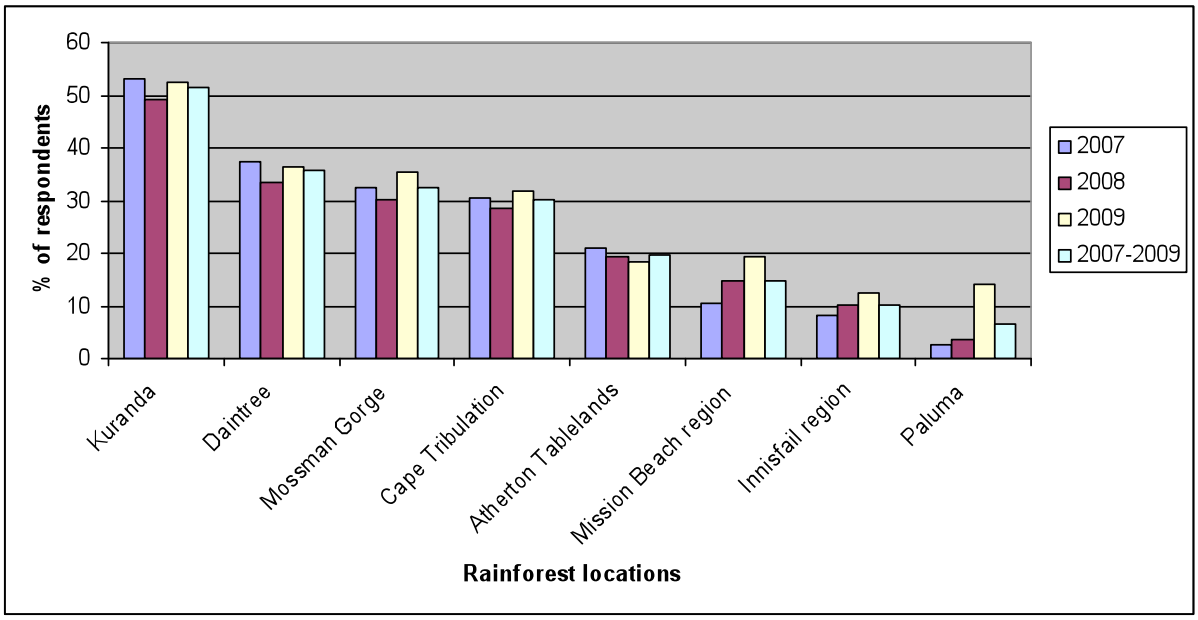

Figure 28: Rainforest locations visited by respondents (as percentages of 2007, 2008. 2009 and the 2007–2009 survey period).

A comparison of rainforest visitation patterns for the 2007–2009 survey period between domestic and international respondents (Table 15) shows that international respondents were more likely to visit the Wet Tropics rainforests in Kuranda, Cape Tribulation, the Mission Beach area, and Paluma, while domestic respondents were more likely to visit rainforest sites in Mossman Gorge, Atherton Tablelands and in the Innisfail region.

Table 15: Comparison of rainforest locations visited by domestic and international respondents for the 2007–2009 survey periods.

Rainforest	**2007–2009 survey period**

locations	Domestic (%)	International (%)
Kuranda	**48.7**	**53.3**
Daintree	**36.8**	**35.5**
Mossman Gorge	**36.2**	30.3
Cape Tribulation	27.2	**32.7**
Atherton Tablelands	25.8	15.9
Mission Beach region	13.0	15.7
Innisfail region	13.7	7.9
Paluma	5.7	6.6

Figure 29 shows the reasons given by respondents for not visiting the rainforest (23.9% in the 2007–2009 survey period). Not enough time (19.6%) was the major reason given followed by not interested in the rainforest (5.8%) and that activities they wished to participate in were not available.

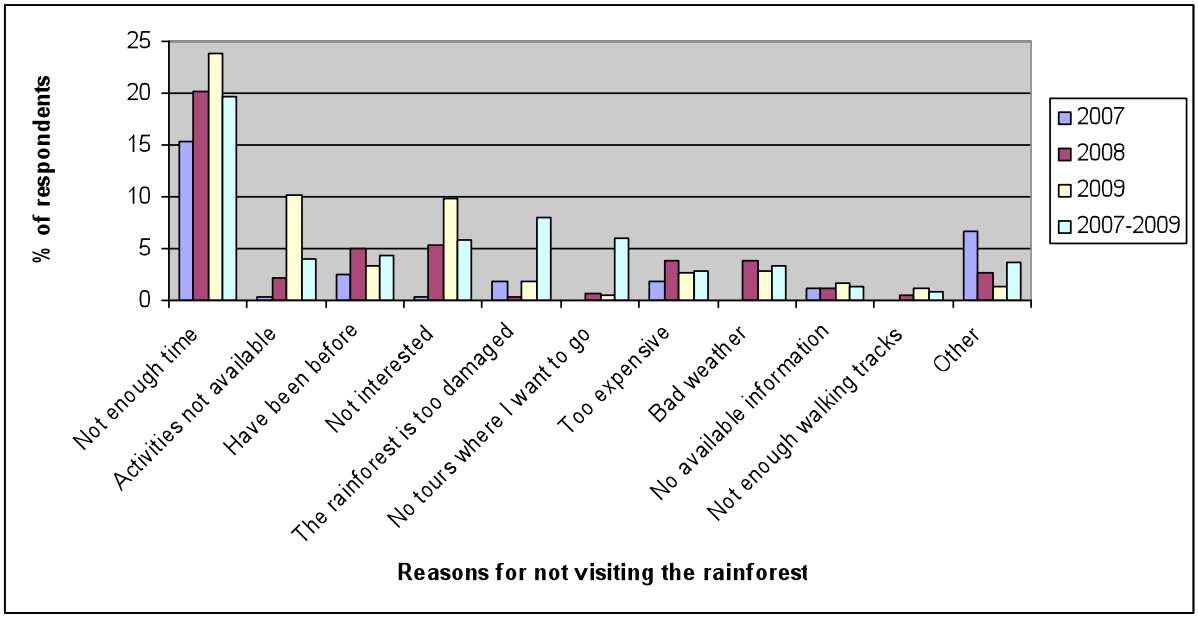

Figure 29: Respondents' reasons for not visiting the rainforests of North Queensland (as percentages of 2007, 2008, 2009 and the 2007–2009 survey period).

Overseas rainforests visited by domestic and international respondents

The survey asked respondents for details of previous visits to rainforests. Respondents were further asked to rate their satisfaction levels of these rainforests on a scale of 1 (very unsatisfied) to 5 (highly satisfied). Results indicate that rainforests in Thailand (n=73) received the most visits and were given a satisfaction mean of 3.97. Costa Rica (n=56) was the second most visited (mean = 4.39) followed by Brazil (n=53; mean = 4.29), Malaysia (n=47; mean = 4.04) and Hawaii (n=46; mean = 4.42)

Interestingly, many respondents indicated that they had visited tropical rainforests in New Zealand (n=25) and other temperate zones suggesting a limited understanding of what a "tropical" rainforest actually is.

5. Management models

As part of the MTSRF research into aspects of rainforest tourism, several issues were selected for additional investigation. In the following section research into walking tracks and climate change is discussed.

5.1 Walking tracks

Walking track demand

Considerable investment has been made into walking tracks in the Wet Tropics World Heritage Area. However, until this project, little was known about the demand for them. The 2007 Rainforest survey included a series of questions about walking tracks and, based on the results, a model for rainforest walking track development was developed and published (McNamara and Prideaux 2011a). In the following discussion we first outline the results of the research into walking tracks and then present the model developed to assist protected area managers plan these tracks.

The rainforest survey posed a question about visitors' level of interest in participating in a number of rainforest activities during their stay. Visitors could respond on a scale of 1 (not at all interested) to 4 (very interested) (Figure 30). The rainforest activity that attracted the most interest was a short rainforest walk (mean=3.54), followed by a self-drive along a rainforest road (mean=3.08). Results outlined in Figure 28 indicate that seasonality did not greatly influence interest in any of these rainforest walking activities.

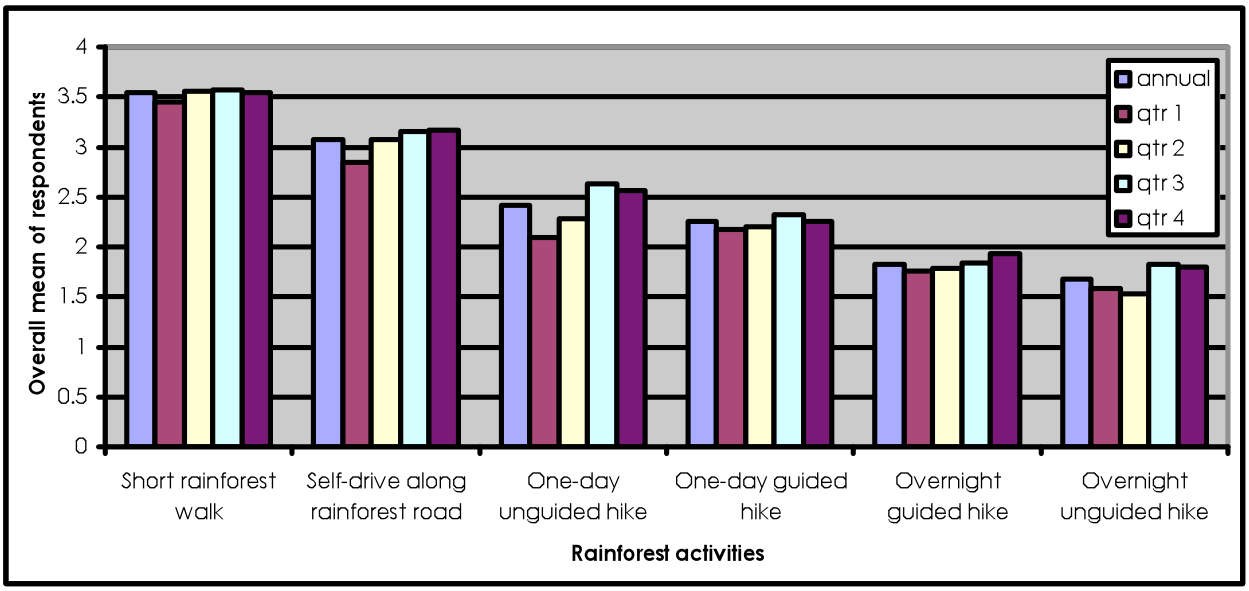

Figure 30: Level of interest in rainforest activities (expressed as mean values of annual and quarterly samples).

Overall, domestic visitors were more likely than international visitors to be interested in a short rainforest walk and a self drive along a rainforest road. International visitors were significantly more interested in all other hikes (one-day guided and unguided, and overnight guided and unguided (

Table 16).

Table 16: Level of interest in rainforest activities of surveyed domestic and international visitors (expressed as mean values of annual sample).

Rainforest activities	**Domestic visitors (mean)**	**International visitors (mean)**
Short rainforest walk	**3.57**	3.50
Self-drive along rainforest road	**3.22**	2.86
One-day unguided hike	2.34	**2.52**
One-day guided hike	2.07	**2.50**
Overnight guided hike	1.63	**2.11**
Overnight unguided hike	1.60	**1.80**

A large number of visitors indicated that they would participate in a number of rainforest activities (except for a self-drive and guided one-day hike) in the Northern Tropics (Table 17).

Table 18: Level of interest in rainforest activities of respondents in each of the four Wet Tropics World Heritage areas (expressed as mean values of annual sample).

Rainforest activities	Northern Tropics (mean)	Cairns/ Kuranda (mean)	The Tablelands (mean)	Central Coast (mean)
Short rainforest walk	**3.57**	3.32	3.45	3.53
Self-drive along rainforest road	3.21	2.69	2.43	**3.57**
One-day unguided hike	2.25	2.13	**2.30**	2.00
One-day guided hike	**2.54**	2.02	1.91	2.07
Overnight guided hike	**1.86**	1.74	1.69	1.71
Overnight unguided hike	**1.75**	1.45	1.43	1.52

When respondents' gender and origin were correlated with interest in these rainforest walking trails, males were significantly more likely than females to be interested in unguided hikes. New Zealanders were significantly more likely to be interested in the self-drive along a rainforest road, whereas North Americans were significantly more interested in a short rainforest walk. Europeans and Scandinavians were significantly more likely to be interested in all the hikes. For instance, Germans were more interested in the one-day unguided and overnight guided hikes, while Scandinavians were more interested in the one-day guided hike.

An analysis of the age of respondents and their interest in rainforest walking trails revealed a number of interesting trends. Visitors most interested in a self-drive along a rainforest road were significantly more likely to be middle aged (40–49 years), whereas those most interested in a short rainforest walk were significantly more likely to be aged between 60–65 years. Younger respondents were most interested in: a one-day unguided hike (30–39 years), one-day guided hike (under 20 years), overnight unguided hike (20–29 years) and overnight guided hike (under 20 years).

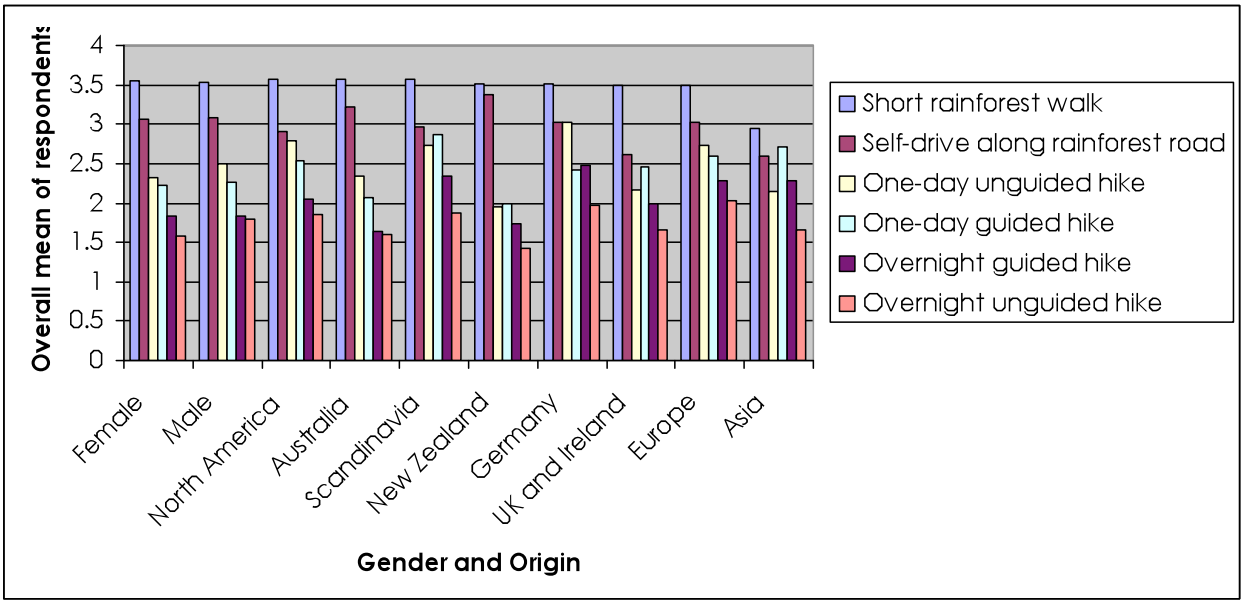

Figure 31: **Level of interest in rainforest activities according to respondents' gender and origin (expressed as mean values of annual sample).**

Observations

This study confirms the importance of the rainforest and walking trails as tourism attractions in the study region. The findings identified respondents' interest in short rainforest walks. Young European travellers preferred longer rainforest hikes. Given the lack of trails of this nature there appears to be a case for further investment in short rainforest tracks (up to half a day) near the larger population centres such as Cairns, Port Douglas, Atherton and Innisfail. In terms of addressing emerging market segments, management agencies may well be interested in developing longer hiking tracks (one-day), particularly in the Northern tropics region, as well as assisting the tourism industry in developing sustainable overnight rainforest tours. For instance, this might well include the re-opening of the CREB Track Walking Trail (with a limited capacity) between Daintree and Cape Tribulation. In preliminary conversations with local tourism authorities, this would be a welcome suggestion to give the area a world class attraction and promote sustainability to the region.

A walking track planning model

Ideally, planning for walking tracks should follow the steps outlined in Figure 32. As illustrated, the planning process commences with an assessment of inputs, including the biological character of the area and infrastructure investment required by the private sector and protected area managers. In areas with pre-existing tracks, an assessment of demand is required. This assessment should also include an assessment of satisfaction with existing tracks.

The major classes of inputs needed in stage 1 are (McNamara and Prideaux 2011a):

1. Sustainability of the resource

- determining carrying capacity based on ecological assessment of the area
- identifying dangers associated with development, such as the introduction of invasive species and loss of biodiversity.

2. Role of management authority

- the level of investment and maintenance required by the management authority
- the capacity of the management authority to supervise the operation of the tracks.

3. Demand factors

- the demand for particular styles of tracks and, where tracks already exist, the level of satisfaction with these tracks
- potential size of the visitor market likely to use the tracks.

4. Commercial input

- investment by the private sector in off-site accommodation and other infrastructure
- investment by the public sector in visitor infrastructure.

5. Key stakeholder input

- local communities that have an interest in the protected area
- indigenous groups that have an affinity with the protected area.

At the conclusion of stage 1, the management authority should have a comprehensive understanding of its supply-side limitations (expressed as carrying capacity and ecological impacts), its ability to manage hiking tracks and an understanding of the demand for various types of walking tracks. Planning may then commence and should engage both the public sector and the community. Beyond stage 1, stages 2 to 7 of the planning model show a standard process of consultation with stakeholders, including indigenous groups, setting of aims and objectives, plan formulation, recommendations to policy holders and, importantly, monitoring. The final outcome (stage 7) should be a walking track that is sustainable, built and operated in a way that satisfies the demand for walking and is within the ecological limitations of the ecosystem/s through which it passes.

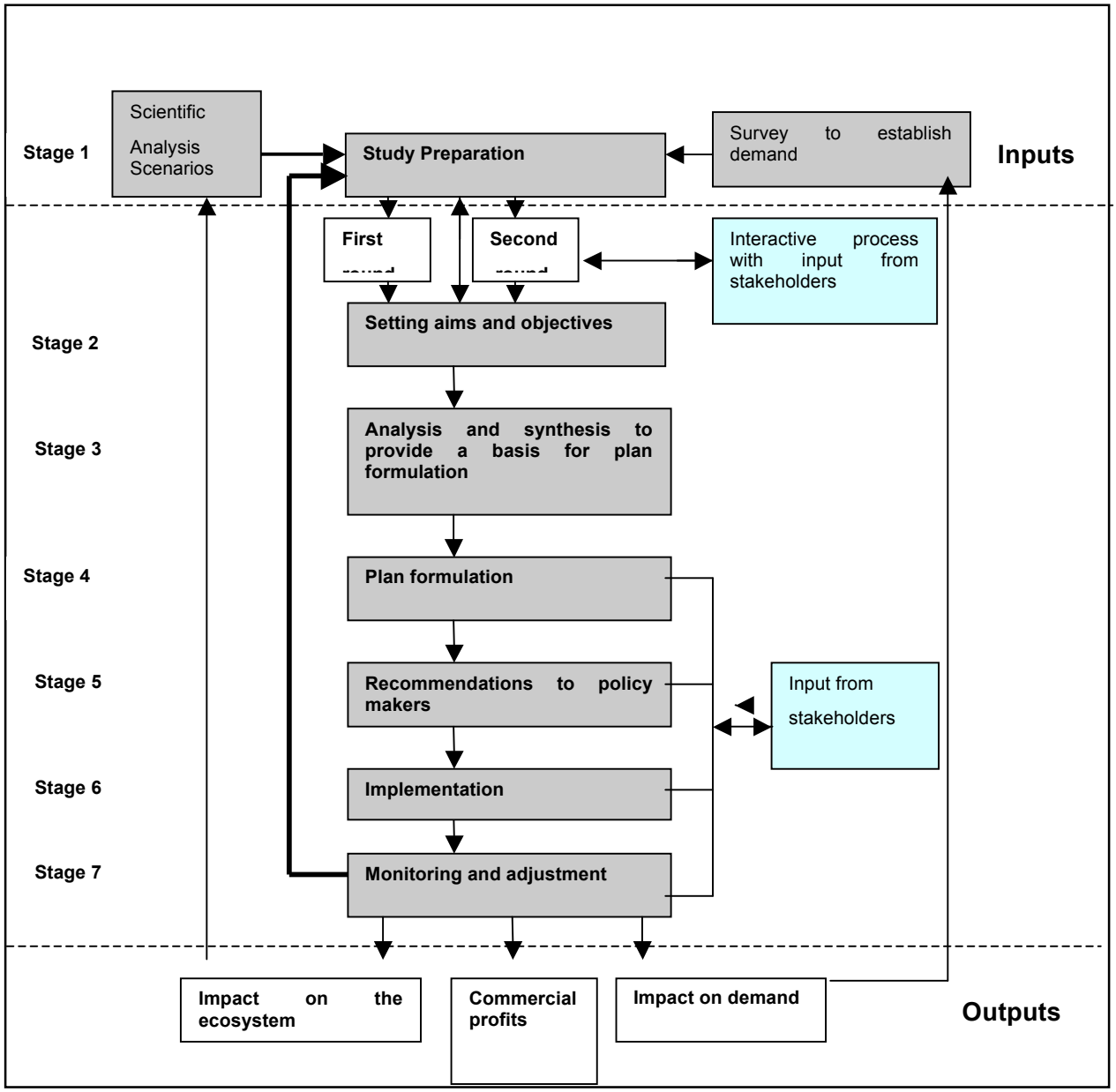

Figure 32: Sustainable Hiking Track Planning Model.

Source: McNamara and Prideaux (2011a)

Outputs

Major outputs include the impact of the walking trail on the ecosystem and the satisfaction derived by hikers. Physical impacts may be assessed by measuring compaction, disruption of breeding and feeding habits and the prevalence of invasive species, using the pre-hiking track condition of the resource as a benchmark. The impact of the experience on the visitor can be measured as a satisfaction level.

5.2 Modeling climate change impacts on rainforest tourism

Climate change is likely to have a significant impact on the ecosystems found in the Wet Tropics rainforests (Williams et al. 2003). In research into the potential impact of climate change, Prideaux and Falco-Mammone (2010) noted that because the forest will remain intact, it is unlikely that climate change will have a serious impact on tourism, with the caveat that media scare campaigns do not degrade the destination image of TNQ. Figure 33 integrates science, supply (defined as landscapes, ambient temperature and scenic views)

and demand (for tourism experiences) into a six-stage Climate Change Impact Model (Prideaux et al. 2010) that can be used to assess possible adaptation strategies. The descriptive model identifies linkages that might not be immediately apparent and was designed as an aid for planning.

Two sets of theory underpin the model: the standard economic demand and supply model where changing supply results in changing demand and the push-pull model of tourism demand outlined previously. In a tourism destination a range of inputs that include local weather patterns; the natural resource (landscapes, scenic views, flora and fauna and weather); infrastructure constructed to support tourism (including accommodation, transport networks, walking tracks and other services); and management of the resource are required to create a tourism experience. The consumption of this product is measured as demand. If the quality of inputs changes, demand will also change, as is likely to be the case with climate change. If the level of impact on the supply side is large there may be a corresponding change in demand.

In Figure 33 (Prideaux et al. 2010) the first-order impacts of climate change are shown as changes to temperature (mean yearly average temperature variations based on day and night and by season), changes in precipitation (rain, snow, fog, clouds), wind (including daily wind speeds and wind events such as wind storms), fire events and changes in sea level. Impacts of this nature produce ecological changes, including loss of biodiversity, changes in the composition of flora and fauna of local ecosystems and reduced sustainability (Stage 2 *Biological/physical impacts)*. Change of this type may cause visible changes to the natural ecosystem and affect tourism demand as shown in Stage 3 *Changes to the mountain environment*. Local changes in climate may affect the physical resources that define the nature and quality of the environment, which is often the major appeal of mountain tourism (Scott et al. 2003). Impacts may include increases in average yearly temperature, changes in plant communities, loss of iconic animal species and changes in settlement patterns . Changes of the nature shown in Stage 3 will have a direct bearing on aesthetic values which may reduce the perceived attractiveness of a specific region (Elsasser and Burki 2002) from a tourism perspective. Changes that occur in Stage 3 will generate impacts on human and natural systems and are shown as Stage 4a *Tourism impacts*.

The impacts shown at Stage 4a may be either negative or positive and are illustrated in Stage 5 *Possible Tourism outcomes*. Negative outcomes may lead to a fall in demand, a fall in investment, a requirement to develop alternative markets and closure of some destinations. Positive outcomes may result in increased tourism flows. Strategies to adapt to climate change impacts are illustrated as Stage *6 Adaption Strategies*.

The major utility of the model is its ability to illustrate the linkages between the various elements of the physical and human systems operating in rainforest destinations. While the model is designed to show linkages and cause and effect loops it can also be used to measure the scale of impact. At each step of the model there is potential to measure the nature and size of impacts through a range of cause and effect relationships. In Stages 1 and 2 for example, a range of science specific methods are able to be used to measure specific factors such as change in temperature, precipitation, wind and fire. These findings may then be used to show possible and probable changes in Stage 2 factors (loss of biodiversity, ecosystem changes, physical changes and reduction in sustainability). At Stage 5, social science research methods including scenarios and surveys may be used to measure the extent of possible changes in consumer demand, which can also be understood in terms of push-pull perceptions.

Once the possible outcomes on tourism have been identified in Stage 5 it becomes possible to examine strategies (Stage 6 *Adaptation Strategies*) that may be used to cope with the changes identified in Stage 2. When considering the strategies that need to be implemented at this stage there is also a need to consider resilience factors.

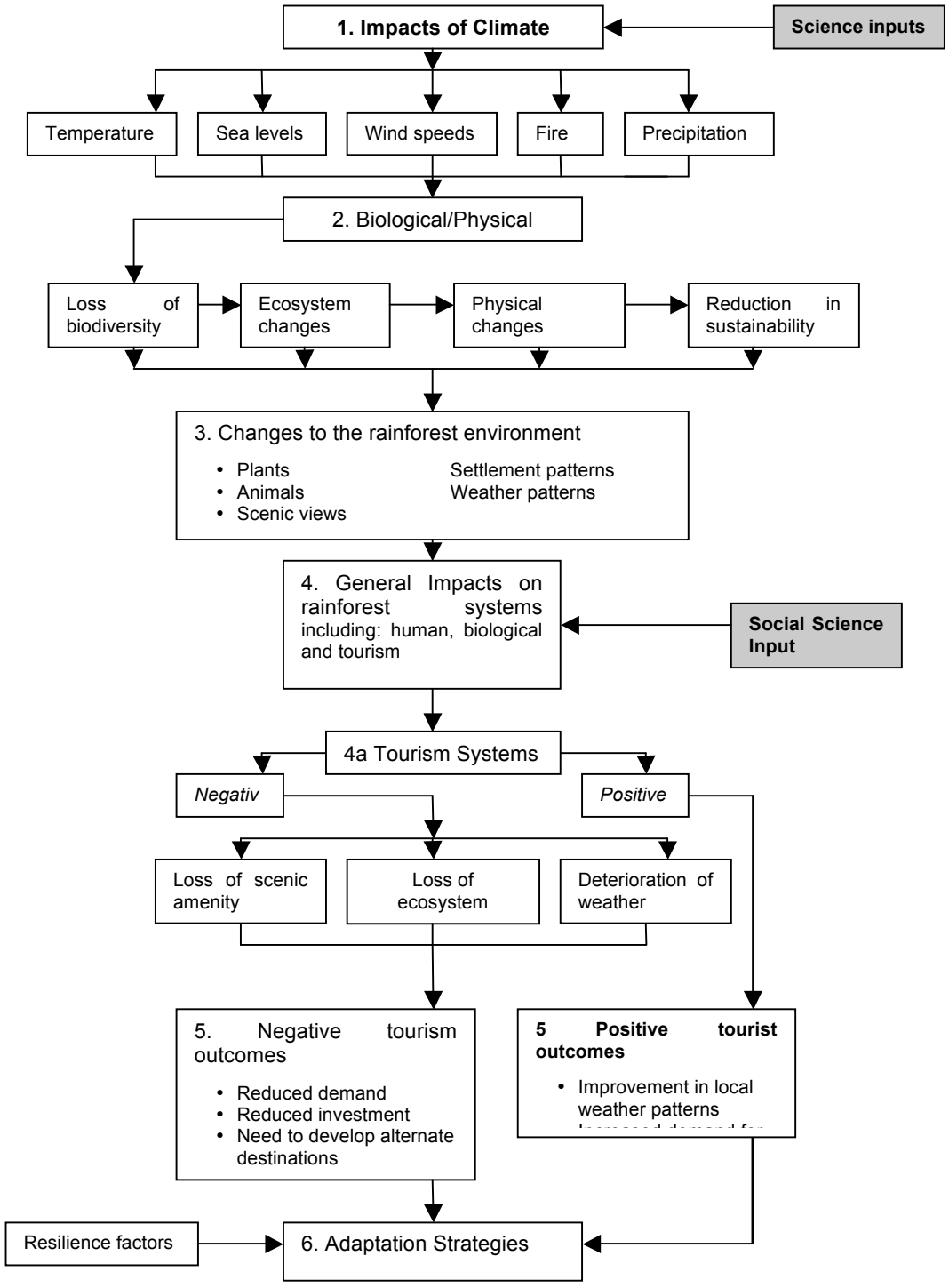

Figure 33: The six step Climate Change Impact Model applied to mountain tourism destinations

Source: Prideaux et al (2010).

The model's primary use in Wet Tropics tourism is its ability to integrate science and social science to demonstrate how the impact of climate change may affect the level of tourism demand in the future. In this way the model may assist in the development of adaption strategies.

6. Research outcomes

Project 4.9.2 (b) has achieved the objectives identified at the commencement of the project These were to understand:

- the socio-demographic characteristics and motivations of visitors
- travel patterns in the Wet Tropics
- activity patterns
- previous rainforest tourism experience
- aspects of environmental concern
- comparison of the WTWHA with other rainforest tourism destinations
- expectations of the rainforest
- threats to the rainforest.

Other reports include planning of walking tracks (McNamara and Prideaux 2011a), rainforest interpretation (McNamara and Prideaux 2011b), a framework for assessing the impacts of climate change (Prideaux et al. 2010), visitor interpretation (McNamara and Prideaux 2010) and a profile of visitors' past rainforest travel patterns (McNamara and Prideaux 2011c).

6.1 Knowledge gaps

A number of knowledge gaps remain, including visitor views on endangered rainforest animals, aspects of environmental behaviour, how this research is used by industry and concerns over threats to the forest. There are also gaps in knowledge about a number of market sectors including non English speaking rainforest visitors.

6.2 Future research

A number of research needs became apparent during the course of the research including:

- the impact of climate change on both the demand and supply sides of rainforest tourism.
- potential for adaptation as climate change issues grow in importance
- changes in visitor segments
- the effectiveness of environmental education on rainforest visitors
- continuing monitoring of individual visitor segments
- the role of mega fauna in stimulation tourism demand.
- a more effective mechanism for integrating scientific and social science research.

7. References

Altinay and Paraskevas (2008) Planning research in hospitality and tourism. Butterworth and Heineann: Oxford, UK.

Bateman, D. (2010) Race against time to save Great Barrier Reef. Cairns Post 10 June 2010, p1.

Carmody, J. and Prideaux, B. (2008). *Community Attitudes, Knowledge, Perceptions and Use of the Wet Tropics of Queensland World Heritage Area in 2007*. Report to the Marine and Tropical Sciences Research Facility. Reef and Rainforest Research Centre, Cairns (120pp.).

Carmody, J. and Prideaux, B. (2010) Living with World Heritage Rainforests: Measuring Community Perceptions, *International Journal of Innovation and Regional Development*, 2: 96–111.

Cater, C. (2005) In deep water? The present state and future scenarios for the *Great Barrier Reef* marine tourism industry. *Proceedings of CAUTHE: Sharing Tourism Knowledge,* 1-5 February, Melbourne, Australia.

Coghlan A. and Prideaux B. (2012) *Reef tourism drivers and trends: Sythesis Report*, Report to the Marine and Tropical Sciences Research Facility. Reef and Rainforest Research Centre, Cairns.

Echtner, C. and Ritchie, B. (2003) The meaning and measurement of destination image. *The Journal of Tourism Studies* 14(1), 37–48.

Eijgelaar, E., Thaper, C. and Peeters, P. (2010) Antarctic cruise tourism: the paradoxes of ambassadorship, "last chance tourism" and greenhouse gas emissions, *Journal of Sustainable Tourism*, 18: 3, 337–354

Elsasser, H. and Bürki, R. (2002). Climate change as a threat to tourism in the Alps. *Climatic Research* 20: 253–257.

King, L. and Prideaux, B. (2010) Special Interest Tourists Collecting Places and Destinations: A Queensland World Heritage Case Study, *Journal of Vacation Marketing* 16: 235–247.

McNamara, KE and Prideaux, B. (2011) Experiencing 'Natural' Heritage, *Current Issues in Tourism*, 14: 47-55.

*McNamara, K.E. and Prideaux, B. (2010b) Reading, learning and enacting: Visitor use of interpretation in the Wet Tropics rainforest, Australia. *Environmental Education Research* 16: 2, 173–188.

*McNamara, K. and Prideaux, B. (2011a) Planning Nature Based Hiking Trails – in a Tropical Rainforest Setting. *Asia Pacific Journal of Tourism Research*, 16: 289–305.

Prideaux, B, Coghlan, A and McNamara, KE (2010) Assessing the impacts of climate change on mountain tourism destination using the climate change impact model, *Tourism Recreation Research*.35: 187-200.

Prideaux, B. (2000) The Role of Transport in Destination Development, *Tourism Management*, 21 (1): 53–64.

Prideaux B. (2009) Resort Destinations: Evolution, Management and Development, Butterworth Heinemann, Oxford., pp. 1–310.

Prideaux, B. and Falco-Mannome, F. (2010) The Impacts Of Cyclone Larry On Tourism In The Mission Beach, Tully & The Atherton Tablelands Region, One Year Later. James Cook University: Cairns.

Scott, D., McBoyle, G. and Mills, B. (2003). Climate change and the skiing industry in southern Ontario (Canada): exploring the importance of snowmaking as a technical adaptation. *Climate Change* 23: 171–181.

Sibtain, J. and Prideaux, B. (2010a) *Rainforest Tourism 2009 and Final Report: January 2007–December 2009. 2007–2009 Patterns of Rainforest Tourism in the Wet Tropics World Heritage Area, North Queensland.* Report to the Marine and Tropical Sciences Research Facility. Reef and Rainforest Research Centre Limited, Cairns (51pp.).

Sibtain, J. and Prideaux, B. (2010b) *Tourist Exit Survey: 2009 and Final Report: January 2007 – December 2009. 2007 – 2009 Patterns of Reef and Rainforest Tourism in North Queensland from Exit Surveys Conducted at Cairns Domestic Airport.* Report to the Marine and Tropical Sciences Research Facility. Reef and Rainforest Research Centre Limited, Cairns (51pp.).

8. Final publication list

Quarterly 'Tourism Barometers'

2007 Rainforest Tourism Barometers – Quarters 1, 2, 3 and 4

2008 Rainforest Tourism Barometers – Quarters 1, 2, 3 and 4

2009 Rainforest Tourism Barometers – Quarters 1, 2, 3 and 4

Available for download: http://www.rrrc.org.au/publications/tourism_barometers.html

Survey Fact Sheet

McNamara, K. (2008), Technical Report: Interest of visitors in walking trails in the Wet Tropics World Heritage rainforest.

Sibtain, J. (2010) Visitors using the internet as a source of information on TNQ (2007-2009)

Sibtain, J. (2010) Visitors participating in birdwatching in TNQ (2007-2009)

Available for download: http://www.rrrc.org.au/mtsrf/theme_4/project_4_9_2.html

Peer-Reviewed Articles

King, L* and Prideaux, L (in press), Special Interest Tourists Collecting Places and Destinations: A Queensland World Heritage Case Study, *Journal of Vacation Marketing*.

McNamara, KE and Prideaux, B. (in press) 'Planning nature-based hiking trails in a tropical rainforest setting', *Asia Pacific Journal of Tourism Research*.

McNamara, KE and Prideaux, B (2010; in press) 'Experiencing 'natural' heritage', *Current Issues in Tourism*.

Prideaux, B, Coghlan, A and McNamara, KE (2010; in press) 'Assessing the impacts of climate change on mountain tourism destination using the climate change impact model', *Tourism Recreation Research*.

McNamara, KE and Prideaux, B (2010) 'Reading, learning and enacting: Visitor use of interpretation in the Wet Tropics rainforest, Australia', *Environmental Education Research*, 16: 2.

McNamara, KE and Prideaux, B (2009) 'A typology of solo independent women travellers', *International Journal of Tourism Research*, 12: 1.

McNamara, KE and Prideaux, B (2009) 'From the one forest to the next: A profile of visitors to Australia's tropical rainforest and their past forest-based travel patterns', *World Tourism Journal*, 1: 1.

McNamara, K. and Prideaux, B. (Accepted 27 September 2009) Do Tourists Themselves Consider Tourism a Threat to Australia's Rainforests? *Consilience: The Journal of Sustainable Development*

Conference Presentations

McNamara, KE and Prideaux, B (2009) 'Exploring the motivations and behaviours of solo women travellers in Tropical North Queensland', *Council for Australian University Tourism and Hospitality Education Conference*, Fremantle.

McNamara, KE and Prideaux, B (2009) 'One with 'nature'? Visitor knowledge, attitudes and behaviours in the rainforest, *Marine and Tropical Sciences Research Facility Conference*, Townsville.

McNamara, KE and Prideaux, B (2008) 'The who, how and what of rainforest tourism in Australia's World Heritage Wet Tropics', *Asia Pacific Tourism Association Conference*, Bangkok.

McNamara, KE and Prideaux, B (2008) 'Just a pretty bunch of trees? Rainforest tourism in the Wet Tropics World Heritage area', *Marine and Tropical Sciences Research Facility Conference*, Cairns.

McNamara, KE, Coghlan, A and Prideaux, B (2008) 'The non nature-based tourists in the tropical north', *Asia Pacific Tourism Association Conference*, Bangkok.