Proceedings of CMT2009, CMT2009/A/006 (14pp) 23 – 26 June 2009, Nelson Mandela Bay, South Africa

SUCCESSFUL INTERPRETATION IN GREAT BARRIER REEF TOURISM: DIVE IN OR KEEP OUT OF IT?

Alexandra Coghlan[1](corresponding author)
K. Ruth Fox[1]
Bruce Prideaux[1]
Michael Lück[2]
[1]James Cook University, School of Business
[2]Auckland University of Technology, School of Tourism and Hospitality
Alexandra Coghlan@jcu.edu.au

ABSTRACT

Marine wildlife tourism has become one of the fastest growing tourism sectors. In the context of the Great Barrier Reef, it focuses on five types of activities: (i) "swim-with" programs, (ii) surface watching activities (whales and dolphins); (iii) diving (corals, sharks, etc), (iv) reef snorkeling trips and (v) glass bottom boat tours. It is proposed that management, product design and experience, and outcome will be different for each of these and not all findings within marine wildlife tourism are transferable between tourism types.

This paper looks at patterns of activities on the Great Barrier Reef (GBR), using visitors surveys (N=3407) collected in a four year study of GBR tourism. Results suggest that the most popular activity is snorkeling (75.5%), followed by swimming (46.2%) and glass bottom boat tours (43.6%). Divers made up a total of 25% of the sample. There were significant differences in the travel experiences and reef tour satisfaction ratings between respondents participating in different types of activities. Non-divers were less likely to have been to other reefs before, less motivated to visit the region to see the GBR, staff had a greater influence on their satisfaction, and they were more likely to say that interpretation during their experience changed their appreciation of the reef and their behaviour. Interpretation had the greatest influence on the behaviour and attitudes of respondents who had participated in a combination of activities, and these respondents also rated their satisfaction with the tour higher than other groups. The implications of the findings are discussed.

Keywords: Great Barrier Reef, activities, interpretation

INTRODUCTION:

Marine wildlife tourism is one of the fastest growing tourism sectors (Higham & Lück, 2007). Orams (1999, p8) highlights the distinct nature of marine tourism, pointing out that it "occurs on, in and under a medium that is alien to humans"; the implications are that it is more dependent upon equipment, and safety issues are more prominent. Although Garrod and Gössling (2008) contend that diving as a recreational activity has been popular for at least 75 years, the major break-through for the rapid development of recreational diving has been attributed to the invention of the "aqualung" by Jacques Cousteau and Emile Gagnan in the early 1940s (Martinez, 2008; Cater & Cater, 2007; Dimmock, 2007). This aqualung is a "self-contained underwater breathing apparatus", better known by its acronym SCUBA (Garrod & Gössling, 2008). After the introduction of the SCUBA equipment, diving experienced enormous growth rates, as illustrated by the worldwide certification figures by the largest professional diving organization, PADI: Having certified 3,226 divers in its first year (1967), this number grew to 932,486 divers in 2008, or a total number of

17,532,116 divers throughout PADI's history (PADI, 2009). Jennings (2007) estimates that there are between five and seven million active divers worldwide.
Another popular tourism activity that demands less training and more basic equipment is snorkeling. Due to the easy use of snorkel, mask and fins, this activity can be adapted for participation by almost anybody (O'Bannon, 2008). It is particularly popular in areas with shallow coral reefs, where snorkelers have outstanding views of the marine life not far below them. In many parts of the world, snorkeling tour boats transfer tourists to coral reefs and drop them at the most suitable spots for this activity. More specialized snorkeling tours include larger wildlife, such as whale sharks or dwarf minke whales (Cater & Cater, 2007; Valentine et al., 2004).

For less active and adventurous tourists, more passive forms of reef tourism have been developed, including glass-bottom boats and semi-submersibles. Glass-bottom boats are fitted with a viewing pane of transparent material (clear acrylic or glass), allowing a view on the marine life below, while seated in the boat (Lee, 2008). Semi-submersibles are – in contrast to submersibles – not diving into the depths of the sea, but have a large portion of the vessel under the surface. This lower part of the vessel part is fitted with windows and allows passengers to view the bypassing marine wildlife. Shallow-draught, flat-bottomed glass-bottom boats and semi-submersibles are particularly suitable for coral reef viewing (Coghlan, 2008, Cater & Cater, 2007).

Many of these marine tourism activities include some distinctive characteristics not applicable to the general tourism research. In particular, the difficulties presented by reef tourism to the successful interpretation of the reef environment and tourism experience will be presented and discussed in this paper. Moscardo (2001) and Coghlan and Prideaux (2009) highlighted the influence of interpretation in visitors' reported satisfaction with their reef experience. However, marine tourists are faced by a number of unique challenges in this alien environment, in which humans may face mobility issues (e.g. swimming in a swell or strong current), whilst wildlife on the other hand may be highly mobile in a three dimensional space. Furthermore, communication between guides and visitors may be very limited, depending on the level of immersion in the marine environment. In this paper, the role of immersion, or activity type, on reef interpretation, as well as other aspects of the reef experience, including differences in visitor profiles between respondents who stay out of the water, go snorkeling, or dive fully in to the reef environment, will be investigated.

The characteristics of marine wildlife tourism

The wildlife-specific marine tourism sector includes five major types of activities: (i) "swim-with" programs (whale sharks, pinnipeds, cetaceans, manatees), (ii) surface watching activities (whales and dolphins); (iii) diving (coral reefs, temperate waters, sharks, etc), (iv) reef snorkeling trips and (v) glass bottom boat tours. For each of these types of activities, many studies can be identified in the literature, (Dobson, 2007; Garrod & Gössling, 2008; Higham & Lück, 2007; Orsini & Newsome, 2005; Shackley, 1992) and several books have attempted to integrate existing research and develop frameworks for researching marine tourism (Orams, 1999; Garrod & Wilson, 2003; Garrod & Gössling, 2008; Cater & Cater, 2007). However, whilst they all take place in or around a marine (sometimes coastal) environment and feature wildlife as a main attraction, it is suggested here that wildlife is the characteristic, perhaps the only one, that the five types of tourism share. The platforms for in-water activities, surface activities (sometimes land-based in the case of whale watching), the proximity of wildlife encounters, and the skill-based required for the activity may be quite different.

Issues in marine wildlife tourism

It is apparent that management, product design, experience and outcome (measured as a satisfaction index) will be different for each activity type and that not all findings within marine wildlife tourism are transferable between tourism types. In particular, there are significant differences between on-water, in-water and below-water activities that have implications for product design, safety issues and environmental or ecological sustainability. For the purposes of this paper 'in-water' is defined as snorkeling activities, on-water is defined as glass bottom tours and 'below-water' is defined as uncertified and certified diving. 'On-land' activities, while not further considered in this paper are defined as activities that support the viewing of turtles hatcheries, shore viewing of whales, marine themed exhibits such as aquariums and watching penguins, seals and walrus enter or leave the sea.

Interpretation in marine wildlife tourism

In the marine environment interpretation has been described as the communication between tour operators and visitors within the tourism setting (Lück, 2008). Wearing et al. (2008) adds that as a 'communication tool' interpretation allows visitors to connect with their tourism destination whereas Munro, Morrison-Saunders and Hughes (2008) look at interpretation more as an influencing tool, influencing visitors to change their attitudes, beliefs and behaviour. In a marine wildlife setting visitors experience marine wildlife first hand, and according to Wearing et al. (2008) if the interpretation is delivered well, the visitor is more satisfied with the tour operator, potentially leading to positive word of mouth recommendations. Some authors have argued that interpretation makes the visitor feel part of the conservation effort and with eco-tourism certification playing an integral part in the management of GBR reef tourism, it is important to know that interpretation can influence conservation views and behaviours (c.f. Beaumont, 2001). Specifically, Chadwick (date unknown) believes that visitors no longer travel to the Great Barrier Reef for a day in the sunshine but require and demand more interpretative activities. Madin and Fenton's (2004) study on the Great Barrier Reef revealed that interpretation on the reef does indeed alter the visitors understanding of conservation and marine life issues.

Marine wildlife interpretation is presented by staff, often guides with qualifications in marine biology, during a range of activities including scuba dive briefs, guided snorkel tours, marine biology talks/videos, fish feeding presentations, glass bottom boat/semi-submersible tours. Interpretation is also provided through the print medium as educational signs, books and brochures. Lück (2003) found that personal interpretation by well-trained staff was the most effective method of delivering interpretation. This observation suggests that interpretation in settings where there are large groups (glass bottom boat/semi-submersible rides, marine biology presentations) is likely to have less of an impact than during activities based around smaller groups (guided snorkel tours).

Some activities are not structured to allow significant interpretation during the activity, diving being the major example. In the case of diving it has been argued that the experience is often more important for the participant than seeing marine life. However, as Orams (1999) suggested personal interaction with memorable animals such as Maori Wrasse, sharks, whales, turtles and dolphins increases visitor's satisfaction levels.

Based on the literature we can expect that visitors who interact with marine wildlife (snorkeling/diving) will have higher satisfaction levels than visitors participating in no interpretative activities or only taking glass bottom boat/semi-submersible trips (Orams, 1999). Previous studies (Wearing et al., 2008) suggested that the more activities/interpretation a visitor undertakes the more satisfied they will be. There is likely to be a difference in the level of attitude change between tourists who have previously had marine wildlife experiences and those that have not. Therefore it is possible that those experiencing new encounters and those undertaking more than one interpretative activity will have the greatest satisfaction and more appreciation of the reef.

This paper adopts a case study approach to the issue of interpretation in a marine environment and examines patterns of activities on the Great Barrier Reef (GBR). The research identifies differences between in-water activities and under-water activities to develop an activity spectrum illustrated in Figure 1. Of particular interest are the opportunities for interpretive learning under 'in-water' and 'under-water' activity conditions. Whilst it may appear that the under-water condition invokes a larger investment in getting close to the reef structure and its associated marine life, the opportunities for learning may be constrained by time, a pre-occupation with diving preparations, the level of skill of both the diver and the dive instructor/guide and the reduced opportunities for communication while participating in the activity. Snorkelers on the other hand, may have a more superficial interaction with the marine life, but also have more opportunity to interact with crew and ask questions, may have more time to undertake other activities such as marine biology tours and glass bottom boat tours, and may be able to focus more on their external environment and less on the skills required to simply remain in the marine environment. As a comparison, we also investigate the experiences of passengers who only undertook glass bottom boat or semi-submersible tours, as an 'out-of-water' activity that requires a lower investment of funds compared to diving, has a low level of interaction with marine animals and has a high level of communication opportunities. Figure 1 presents some of the features of each activity condition and how these might influence the visitor experience.

Figure 1 has two scales: the vertical scale represents the investment in time and money that is required to have the opportunity to get close to marine wildlife while the horizontal scale represents the opportunity to communicate with tour staff/guides. Thus visitors undertaking a glass-bottom boat trip have considerable opportunities to communicate with staff but a greatly reduced opportunity to get close to marine animals.

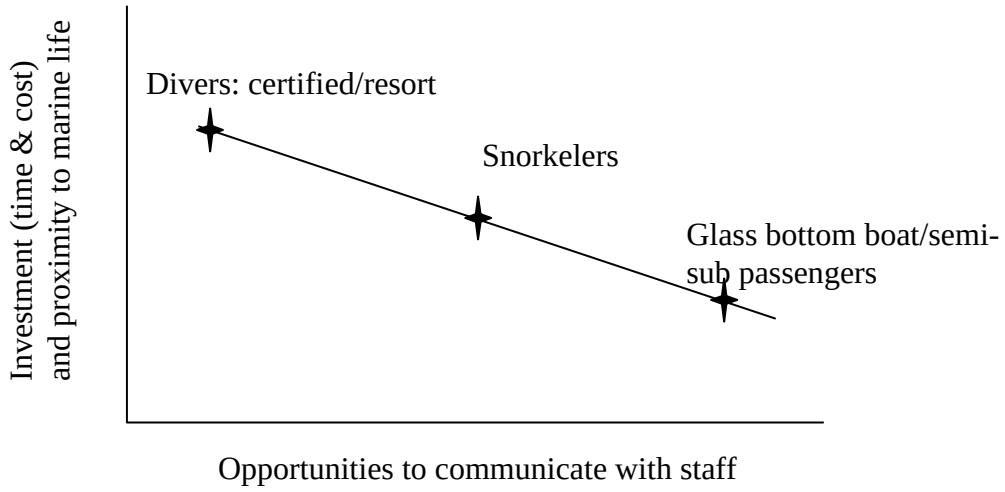

Figure 1: The proposed relationship between activity type, immersion and opportunities for interpretive learning.

AIMS:

This paper investigates the correlations between tourists' level of immersion within the marine environment defined as on-water, in-water and under-water experiences and their perception of the quality of interpretation they received. The paper also examines the correlation effects between activity type and:

a) visitor profile

b) travel motivations and previous exposure to reef environments
c) trip satisfaction including importance of the natural environment to the overall experience.

METHODS:

Visitors surveys used in this research were collected as part of a four year study of GBR tourism funded by the Marine and Tropical Sciences Research Facility (MTSRF). The survey was undertaken with the assistance of 11 operators across four regions (Port Douglas, Cairns, Townsville and Airlie Beach). The diversity of operators and locations ensures that nearly all the activities that are offered on the reef are represented, including pontoon trips, helicopter tours, all SCUBA diving activities (intro/resort, certified and training), helmet dives, snorkel tours, viewing chambers, semi-submersible tours, glass bottom boat tours, sailing and visiting the islands. In this study, 77% of surveys came from pontoon-based operators, 16.3% from smaller day boats that visit coral cays, 3.5% that use moorings on the outer reef, and 3.2% of surveys came from island resorts.

The survey instrument examines socio-demographic profiles, travel behaviour, reef experiences and activities, satisfaction and travel motivations using closed questions. Open-ended questions were used to examine best and worst experiences, memorable information gained from interpretation activities and the factors that influence satisfaction. For the purpose of this study, only the surveys collected by partner operators that offered glass bottom boat or semi-submersible tours, snorkeling and certified and resort diving were used. The final sample included five operators, and 3407 respondents. Of these, 127 did not undertake any of the activities being investigated, 1430 respondents participated in one activity type (out-of-water, in-water and under water activity) and the remainder participated in more than one type of activity. All completed surveys were included in the analysis, were input into SPSS Version 17.0 and coded to reflect no activities (0), out-of-water only (1), in-water only (2), underwater only (3) and combination (4). The finally tally is shown in Table 1. In cases where respondents had undertaken more than one type of activity, we find that only rarely did they combine all three types of activities (N = 197), underwater and out-of-water activities (N= 50), or even in-water and underwater activities (N =158).

	Frequency	Valid Percent
0. no activities*	127	3.7%
1. out-of-water	326	9.6%
2. in-water	844	24.8%
3. underwater	260	7.6%
4. combination	1850	54.3%

*no activities in this case refers to respondents who did not go on a glass bottom boat tour, snorkeling or diving.

Table 1: the percentage of respondents in each activity category

Table 2 outlines the combinations of activities participated in by respondents. The most popular combination of activities was snorkeling and a trip on a glass bottom boat or semi-submersible. Divers, both certified and uncertified, were the least likely to participate in activities beyond diving, with 66% of resort divers going snorkeling and only one third undertaking a glass bottom boat tour. Even fewer (55.7%) certified divers went snorkeling and only 28% went on a glass bottom boat tour.

	Glass bottom boat tour	Resort dives	Certified dives	Marine biologist tour (N = 359)
Snorkeling (N=2606)	1451	280	223	316
Glass bottom boat tour (N=1861)	-	145	112	245
Resort dives (N = 421)		-	N/A	23
Certified dives (N = 400)			-	21

Table 2: Activities undertaken by respondents participating in a combination of activities.

To understand the activities available to respondents and how this might influence the manner in which they arrange their activities on an average day at the reef, Table 3 illustrates a typical reef trip schedule highlighting the opportunities to interact with crew and participate in different activities. It should be noted that this table reflects timings for tours where the reef is some distance from the coast. Where the reef is located closer to the shore the timings for the trip to and from the reef site will be shorter.

Time	**Non-swimmers**	**Snorkelers**	**Divers**
8:30am – 8:45am	Arrive at boat		Arrive at boat, met by dive instructors, discuss diving and complete paperwork
9:00am – 9:15am	Boat safety briefing and activities introduction		
9:15am – 9:35am	Travel to reef	Discuss snorkel tour with marine biologist	Dive briefing
10:00am – 10:15am	Marine biology presentation		
10:25am – 10:35am	Arrive at reef – destination briefing		
10:45am – 11:00am	Relax on pontoon/boat	Gear up for snorkeling	Gear up for dive
11:00am – 11:10am	Relax on pontoon/boat	Get into water	Skills testing
11:10am – 11:30am	Glass bottom boat/semi-submersible tour	Snorkeling or guided snorkel tour	Scuba dive
11:30am – 11:40am			Dive debrief
12:30pm – 1:00pm	Lunch	Lunch	Lunch
			If conducting a second dive
1:00pm – 1:10pm	Fish feed		Gear up for dive
1:10pm – 1:45pm	Relax on pontoon/boat	Snorkeling, snorkel tour or glass bottom boat/semi-submersible trip	Scuba Dive
1:45pm – 1:55pm	Relax on pontoon/boat		Dive debrief
3:00pm	Get back on board boat for return to shore		
4.30pm	Trip finishes		

Table 3: An example of a typical reef day trip and the range of activities undertaken

Methodological limitations

It must be noted that there are several limitations to the survey distribution method used in this research. The first is that survey distribution and collection is entirely dependent on boat crews, which creates the potential for surveys to be misplaced or forgotten amongst other crew duties, and may lead to concerns over the randomization of sampling, both in terms of respondents and conditions under which distribution occurs (rough/calm seas, no or lots sunshine, poor/good water clarity). Whilst boat crews have been asked to maximize sampling randomization (e.g. asking the crews to approach every fourth table on the larger boats, or every third seated person on the smaller boats, on set days of the month), it cannot always be guaranteed that staff, particularly new or casual staff, are following these instructions. The issue of randomization has been addressed through large sample sizes, built up through time. The usual limitation of seasonality was addressed by the monthly collection frame that was used.

RESULTS

Results are presented sequentially, each new result building on the previous result in the sequence. The outline of results commences with an overview of the profile, activities, motivations and satisfaction of respondents followed by an analysis of the relationship between activities based on:

- visitor profile
- travel motivation & previous reef experiences
- interpretation, and likelihood of stating that respondents saw marine animals
- satisfaction scores and influencing factors.

Overview of results:

This section provides an overview of the results, independent of activity type. On a gender basis 57% of the respondents were female, By nationality, 47% were Australian, followed by UK & Ireland (22.1%) North American (14.4%) and Europeans, (10.4%). Almost one third of respondents (29.7%) were between 20 and 29 years old, with 18.2% between the ages of 30 and 39 and 31% between 40 and 59 years of age. The most frequently cited occupation was professional (27.0%), followed by students (14.6%) and retirees (10.0%). Thirty nine percent of respondents were travelling with their partner, another 19.9% were travelling in family groups, and 17.1% were travelling with friends.

Visiting the GBR was the most important travel motivation for these respondents with a mean score of 4.68 on Likert-scale where 1 = not at all important and 5 = very important. Other important motivations included “snorkeling and diving” (4.04), ‘Rest and Recreation’ (4.02), “experiencing the natural environment” (3.96), “Visiting the beaches” (3.67). For 76.2% of respondents, this was their first visit to their holiday destination and only 29% had visited the GBR previously. However, 43.3% had visited other reefs before their trip to the GBR. Thirty percent of respondents planned to dive the reef during their trip, and of these, 36.6% had no prior diving experience, and 28.5% had logged less than five dives. Twenty five percent of respondents who planned to dive the reef had logged 10 dives or more before this visit to the GBR. The most commonly activity participated in was snorkeling (77.1% of respondents) followed by glass bottom boat tours (55%), swimming (50%), viewing marine animals (38.2%), resort diving (12.5%), snorkel tours led by marine biologists (11.8%) and certified dives (11.3%).

Over half the respondents (53.7%) felt that they had somewhat increased their knowledge of the reef after this visit, 41.1% saying that it had greatly increased their knowledge, and 5.3% saying that they had gained no knowledge. The most commonly used source of information was TV

documentaries and films such as *Finding Nemo* (38.6%), whilst 32.7% of respondents learned about the reef from a biology talk given during their trip. Videos shown on board the vessel were mentioned by 24.3% of respondents. Almost two thirds (62.4%) of respondents said that the interpretation had changed their appreciation of the reef, and another 52.4% said it changed their behaviour at the reef. The most memorable information gained from the interpretation largely fell into two categories, natural science (31.7%) and management & threats (20.8%). The most common responses were the fragility of the reef, not to touch/stand on the reef, the diversity of the marine environment and how slow the reef grows. Individual species were also common responses such as turtles, sharks, and Maori Wrasse. Only 1.6% of those surveyed responded that they learnt nothing from their trip. The most frequent request for further information on the reef related to the conservation of the reef (23.5% of respondents), the history of the reef (21.4%) and the biodiversity of the reef (20.8%).

Satisfaction with the reef experience was relatively high with a mean score of 8.49 out of a 10 point Likert scale (where 10 was the highest score). Almost two thirds (63.4%) of respondents felt that their expectations of the reef had been greatly met, 64.2% said the same of their experience at the reef while 84.3% felt that they had received good value for money, and 94.4% indicated that they would recommend a visit to the reef to others. The quality of service and staff conduct accounted for 48.2% of responses to the factors that affected satisfaction, whilst another 22.0% mentioned the quality of the natural environment, and 20.7% cited the weather as a factor. Snorkeling and diving accounted for 13.0% of responses concerning satisfaction ratings, but 44.8% of responses concerning the best experience of the day. The marine life itself accounted for 28.5% of responses, and staff were mentioned in 12% of responses. The worst experiences of the day focused on poor weather (27.5%). In 25% of cases, respondents felt that they had had no bad experience.

It is against the backdrop of these results that we now examine variations in visitor profiles, travel visitor profile, travel motivation, previous reef experiences, likelihood of stating that respondents saw marine animals, learning and interpretation, and satisfaction scores and influencing factors according to the types of experiences undertaken by respondents (out-of-water, in-water, underwater, combination, or none). For each set of variables, we highlight those that show significant variation using a Chi-squared test or ANOVA tests (travel motivations and satisfaction scores) where frequencies or means are compared across activity types.

Differences in Visitor Profiles based on activity type

All visitor profile variables investigated showed significant variation across activity types. Table 4 lists some of the significant differences that were noted between respondents undertaking different activities. For instance, there was a disproportionately higher percentage of females who stayed out of the water (65.1% of all out-of-water respondents) and a higher proportion of men who went diving (55.8% of all divers). International visitors, particularly Americans (14.6%), were more likely to stay out of the water, whilst Australians were more likely undertake a combination of activities. Some of the general differences that were found between groups are that:

- Out-of-water respondents were more likely to be female, international (USA), older, retires and travelling as a couple or in tour groups
- In-water respondents were more likely to be European, 20-29 years old, students
- Underwater respondents were more likely to be male, 20-29 years old and solo travelers
- Combination respondents were more likely to be Australian and travelling in family groups.

Interestingly, there was no distinct profiles for respondents who did not undertake any of the activities mentioned above.

Differences in travel motivations and reef experiences based on activity type

Repeat visitors were more likely to plan to dive and undertake underwater activities (39% of repeat visitors went diving). Respondents who had previously visited other reefs were also more likely to go diving (65.9% of underwater respondents). Looking at travel motivations, respondents who did not undertake any activities rated "visiting the GBR" significantly lower (4.5) than other respondents (4.7), whilst they were significantly more likely to rate "experiencing the natural environment" higher than other respondents (4.06). Underwater respondents rated "snorkeling and diving" significantly higher than any other group (4.45), particularly the out-of-water group (2.39).

Differences in interpretation & likelihood of seeing marine animals

Visitors' likelihood of stating that they saw marine animals also varied according to the activity they undertook. Respondents most likely to say they saw marine animals fell into the combination group (47.8% of the combination group) or the out-of-water group (43.3%). Interestingly, of those who went snorkeling, 22.7% said they saw marine animals, and even fewer underwater respondents reported seeing marine animals (12.4%). Respondents who participated in a snorkel tour were most likely to say that they had seen marine animals (54%). A greater proportion of respondents (45.0%) who undertook a combination of activities felt that their knowledge had greatly increased as a result of their trip, whilst a significantly lower proportion of underwater respondents (28.0%) said that their knowledge had greatly increased. A similar pattern emerged with attitudinal and behavioural changes as a result of the trip. In both cases a smaller proportion of underwater respondents felt that their attitudes or behaviour had changed as a result of the information they received that day. The group of respondents most likely to say that their behaviour and attitudes had changed was the out-of-water and combination respondents (Table 4). In particular this may be a result of the different levels of underwater experience each group has experienced in the past.

	Changed attitude	Changed behaviour
No activities	56.8%	51.4%
Out-of-water	68.3%	53.5%
In-water	54.6%	47.8%
Underwater	53.5%	44.9%
Combination	66.7%	55.3%

Table 4 Differences in changed attitudes & behaviour between activity groups.

When asked what, if any, further information about the reef respondents would like to receive, we find that in-water and combination groups were most likely to request information about the biodiversity of the reef (21.4% and 21.7% respectively), whilst only 14.3% of the underwater group were interested in knowing more about the reef's biodiversity. Combination respondents were also most interested in finding out more about the conservation of the reef (25.3%), whilst respondents who did not participate in any activity were the least interested (9.1%). Finally, underwater respondents were the least likely to want to know about the benefits that humans derive from the reef (1.4% compared to 18.5% of combination respondents.

Differences in satisfaction and best and worst experiences between activity groups:

By comparing satisfaction scores between respondents participating in different activities, a number of interesting patterns emerged. Firstly, whilst there are significant differences in satisfaction scores between participants in different activities, there is no immediate pattern to these results (Figure 2).

However, out-of-water respondents were most likely to feel that the experience had not met their expectations (6.7%) and that they were unsure that their trip represented value for money (11.1%).

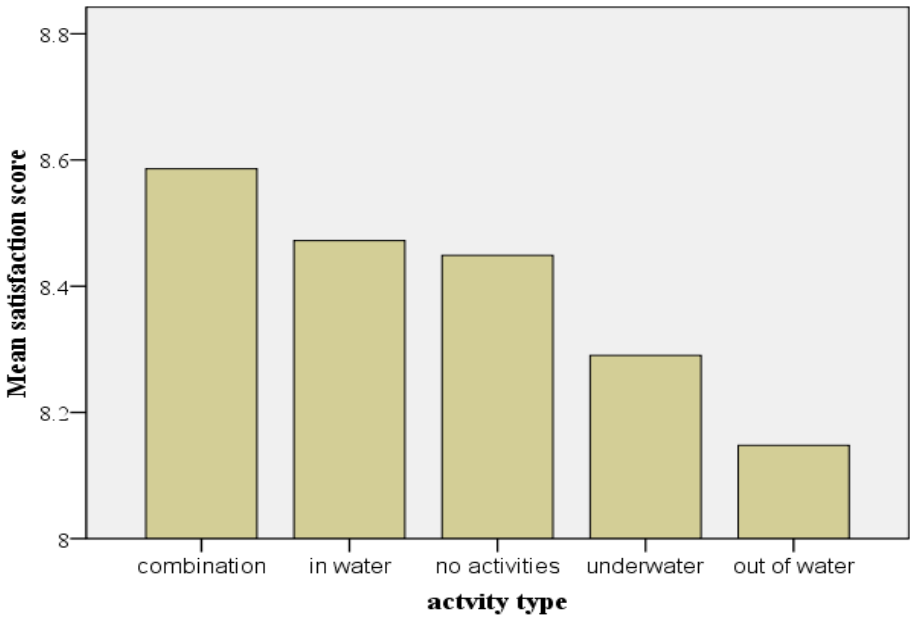

Figure 3: differences in satisfaction scores for different activity groups.

Looking at the factors that influenced satisfaction and best and worst experiences of the day, many of the variables were stable across all activity groups; staff were consistently the most important influence in satisfaction scores, mentioned by 45.7% of no activities respondents increasing to 50% for the out-of-water respondents. The importance of staff as a best experience was also consistent. The weather as factor in satisfaction and worst experiences showed little variation between groups. Furthermore, no significant differences were noted between groups in the frequency with which they mentioned the marine wildlife as a best experience. Some significant differences were also noted in the frequency of responses that focussed on the natural environment as a determinant of satisfaction. This was highest for in-water respondents (27.4%) and lowest for out-of-water respondents (16.8%).

DISCUSSION:

The implications of the results presented in this study operate at two levels; first, we can consider how the results fit previous research and the model in Figure 1, by looking specifically at the influence of activity type on how interpretation is received and the effects on the reef experience. Next we can look at the correlations between activity type and visitor profiles and satisfaction, in order to make inferences about the future of reef tourism and product development and design.

In the first instance, we find that there does appear to be differences in each group of respondents (no activities, out-of-water, in-water, underwater and combination groups). In Figure 4, the model outlined in Figure 1 has been adjusted by overlaying interpretation and marine wildlife sightings data onto it. It is apparent that opportunities to communicate with staff have a greater influence on interpretation than proximity to the marine wildlife, supporting the findings of Orams (2000) and Luck (2003). However, the lower satisfaction scores of both the out-of-water and underwater groups show that whilst good interpretation may significantly increase satisfaction, there appear to be other confounding variables that influence satisfaction (for instance time pressures or travel motivations)

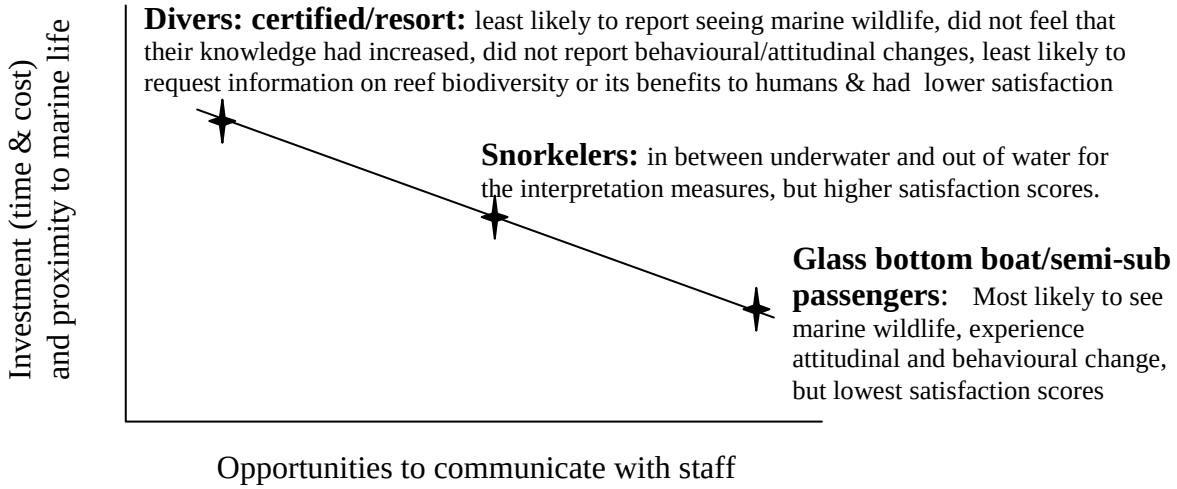

Figure 4: Differences in activity participation in the reef experience, interpretation and satisfaction.

Respondents who undertook a combination of activities were of particular interest as the scores of these respondents were consistently higher on all variables measured. They were the most likely to see marine animals, to feel that their knowledge greatly increased, that they would like more information about reef biodiversity and conservation. Their average satisfaction scores were significantly higher than others groups. These results indicate an interaction factor between the X axis and Y axis of Figure 1; greater proximity to marine wildlife and investment in the experience may produce a higher quality reef tourism experience when combined with more opportunities to communicate with staff. The staff of marine tour operators play an important role in mediating or shaping the reef tourism experience (c.f. Luck, 2003); staff consistently appear as the most influential factor in determining tourist satisfaction. Coghlan & Prideaux (2009) found that staff knowledge of the reef accounted for 10% of the open-ended responses to the question "what factors influenced your satisfaction score?". This adds support to Wearing et al.'s (2008) findings that in relation to National Park surveys, personal interaction with park guides provided the most interpretative satisfaction with amount of interaction coming a close second. It is also worth noting the importance of activities schedules on reef tours, as demonstrated by Green (1997) who found that visitor satisfaction levels increased across a range of variables when the range of activities and the times that these were available were clearly communicated with tourists visiting the GBR.

This research also raises questions about the qualitative differences between personal interpretation offered by guides (and other staff) and impersonal interpretation, such as posters, signage, books and signage (Moscardo, 2002 & Moscardo et al. 1997). It is likely that there is a certain expectation that all crew (not only the marine biologist) will have a good level of knowledge of the reef, its biodiversity, its history and conservation status. However this may not always be the case, allowing for misleading or incorrect information about the reef from ill informed staff in cases where effective staff training is not implemented.

A second set of implications that arise out of these results focus on the variations in reef tourism experiences by different market segments of visitors to the reef. The data show that respondents' socio-demographic profiles influence the types of activities undertaken. For example, domestic tourists (who were also repeat tourists) were the most likely to combine different activities and "get the most" out of their experience, and were also likely to say their behaviour and attitudes changed as a result of the interpretation provided. This is an encouraging result in a future scenario where international tourism numbers may drop in the short to mid-term across the GBR region. The lower satisfaction scores of international and older respondents are of some concern, however, it would

appear that they too felt that they benefitted from the interpretation provided. The findings also show that there is a group of respondents (those with a mean score of 3.5 or less) who were less motivated to travel to the region to visit the GBR, and these same respondents were more likely to say that their expectation had not been met and they were unsure that the trip represented good value for money.

Conversely, the combination group had the highest satisfaction scores (a mean of 8.59), the greatest interest in and knowledge gain from interpretation. Domestic visitors made up half (49.5%) of this group. The current Global Financial Crisis is likely to produce a shift in the makeup of reef visitors in the future, potentially including an increase in the importance of domestic visitors. Research by Coghlan & Prideaux (2009) found that over half of domestic visitors had been to the Great Barrier Reef before, underlining the importance of repeat visitation for the economy of the region, and increasing the likelihood that these visitors would engage in profitable, upselling activities such as guided snorkel tours and certified or resort diving.

CONCLUSION

Using the results described in Figure 4, this study has revealed some interesting trends in reef tourism, visitor experiences, satisfaction and interpretation. The results confirm that up close, personal interaction with wildlife is not always a key ingredient in effective interpretation, whilst the mediating influence of staff is vital. Divers, who had invested heavily in getting close to reef wildlife did not appear to gain the full benefits of interpretation, whilst the respondents who stayed out of the water were more likely to experience behaviour and attitude changes. On the other hand, satisfaction with the experience did not correlate with an appreciation of the interpretation, leading to some interesting questions on the role of interpretation in tourism as a management tool or as a means to enhance the visitor experience. It is clear, however, that all staff must be able to provide adequate information on the reef, its management, history and inhabitants.

REFERENCES

Beaumont, N. (2001) Ecotourism and the conservation ethic: recruiting the uninitiated or preaching to the converted? Journal of Sustainable Tourism, Vol. 9, No.4, 317-341.

Cater, C., & Cater, E. (2007). Marine Ecotourism: Between the Devil and the Deep Blue Sea. Wallingford: CAB International.

Chadwick, V. (unknown) Managing tourism in the Great Barrier Reef Marine Park – doing it better. Chapter 7, 91-98.

Coghlan, A. & Prideaux, B. (2009) Reef tourism second yearly report. Quarterly patterns of reef tourism on the GBR, Northern, Whitsunday and Southern regions. Marine and Tropical Sciences Research Facility, Cairns (40pp.).

Coghlan, A. (2008). Semi-submersible. In M. Lück (Ed.), The Encyclopedia of Tourism and Recreation in Marine Environments (pp. 425). Wallingford: CABI.

Dimmock, K. (2007). Scuba Diving, Snorkeling, and Free Diving. In G. Jennings (Ed.), Water-based Tourism, Sport, Leisure, and Recreation Experiences (pp. 128-147). Amsterdam: Elsevier Butterworth-Heinemann.

Dinsdale, E.A. & Harriott, V.J. (2004). Assessing anchor damage on coral reefs: a case study in the selection of environmental indicators. Environmental Management, 33,126-139.

Dobson, J. (2007). 'Jaws or Jawsome'? Exploring the shark-diving experience. In M. Lück, A. Graeupl, J. Auyong, M. L. Miller & M. B. Orams (Eds.), Proceedings of the 5th International

Coastal & Marine Tourism Congress: Balancing Marine Tourism, Development and Sustainability (pp. 37-49). Auckland: School of Hospitality & Tourism and New Zealand Tourism Research Institute, AUT University.

Fenton, D.M., Young, M. & Johnson, V.Y. (1997). Representing the Great Barrier Reef to tourists; implications for tourism experience and evaluation of coral reef environments. Leisure Science 20: 177.

Garrod, B. & Gossling, S. (ed.)(2008) New frontiers in marine tourism: diving experiences, sustainability, management. Elsevier, Oxford, UK.

Garrod, B. & Wilson, J.C. (ed)(2003) Marine ecotourism: issues and experiences. Channel View Publications, Bristol, UK.

Green, D. (1997). The development and evaluation of activity schedules for tourists on one-day commercial reef trips. CRC Reef Technical Report No. 18. CRC Reef Research Centre, Townsville.

Higham, J. E. S., & Lück, M. (2007). Marine Wildlife and Tourism Management: In search of scientific approaches to sustainability. In J. E. S. Higham & M. Lück (Eds.), Marine Wildlife and Tourism Management: Insights from the natural and social sciences (pp. 1-16). Wallingford: CABI.

Jennings, G. (2007). Water-Based Tourism, Sport, Leisure, and Recreation Experiences. In G. Jennings (Ed.), Water-Based Tourism, Sport, Leisure, and Recreation Experiences (pp. 1-20). Amsterdam: Elsevier Butterworth-Heinemann.

Lee, C. (2008). Glass-bottom Boat. In M. Lück (Ed.), The Encyclopedia of Tourism and Recreation in Marine Environments (pp. 190-191). Wallingford: CABI.

Lück, M. (2009). Environmentalism and Tourists' Experiences on Swim-With Dolphins Tours: A case study of New Zealand. Saarbrücken: VDM-Verlag.

Lück, M. (ed.)(2008) The Encyclopedia of Tourism and Recreation in Marine Environments. CAB International, Wallingford, UK.

Lück. M. (2003) Education on marine mammal tours as agent for conservation – but do tourists want to be educated. Ocean & Coastal Management 46, 943-956.

Madin, E. & Fenton, M. (2004) Environment interpretation in the Great Barrier Reef Marine Park: An assessment of programme effectiveness. Journal of Sustainable Tourism, Vol.12, No.2, 121-137.

Martinez, E. (2008). Cousteau, Jacques-Yves. In M. Lück (Ed.), The Encyclopedia of Tourism and Recreation in Marine Environments (pp. 120-121). Wallingford: CABI.

Moscardo, G. (2002). Don't know, don't care: the importance of information for visitors to the Great Barrier Reef. In E. Laws (ed.) Tourism Marketing. London: Continuum.

Moscardo, G. 2001, Understanding visitor-wildlife interactions: Factors contributing to satisfaction, CRC Reef Research Centre, Townsville.

Moscardo, G., Woods, B. & Pearce, P.L. (1997). Evaluating the effectiveness of pictorial symbols in reef visitor education. CRC Reef Technical Report No. 49. CRC Reef Research Centre, Townsville, 30pp

Munro, J.K., Morrison-Saunders, A. & Hughes, M (2008) Environmental interpretation evaluation in natural areas. Journal of Eco-Tourism, Vol.7, No.1, 1-14.

O'Bannon, T. (2008). Snorkeling. In M. Lück (Ed.), The Encyclopedia of Tourism and Recreation in Marine Environments (pp. 438-439). Wallingford: CABI.

Orams, M. (1999) Marine Tourism: Development, Impacts and Management. Routledge, Abingdon, UK.

Orams, M. (2000) Tourists getting closer to Whales, is it what whale-watching is all about? Tourism Management, Vol. 21, No.6, pp561-569.

Orsini, J.-P., & Newsome, D. (2005). Human Perceptions of Hauled Out Australian Sea Lions (Neophoca cinerea) and Implications for Management: A Case Study From Carnac Island, Western Australia. Tourism in Marine Environments, 2(1), 23-37.

PADI. (2009). PADI Worldwide Certification History. Retrieved 30 March, from http://www.padi.com/scuba/about-padi/PADI-statistics/default.aspx

Plathong, S., Inglis, G.J. & Huber, M.E. (2000). Effects of self-guided snorkeling trails on coral reefs in a tropical marine park. Conservation Biology, 14, 1821-1830.

Valentine, P. S., Birtles, R. A., Curnock, M., Arnold, P., & Dunstan, A. (2004). Getting closer to whales: passenger expectations and experiences, and the management of swim with dwarf minke whale interactions in the Great Barrier Reef. Tourism Management, 25, 647-655.

Wearing, S., Edinborough, P., Hodgson, L. and Frew, E. (2008) Enhancing visitor experience through interpretation: An examination of influencing factors. CRC for Sustainable Tourism Report, 56pp.