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**Published**

2011

**Journal Title**

Tourism in Marine Environments

**DOI**

[10.3727/154427311X13038402065785](https://doi.org/10.3727/154427311X13038402065785)

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## **DIVE MARKET SEGMENTS AND DESTINATION COMPETITIVENESS: A CASE STUDY OF THE GREAT BARRIER REEF IN VIEW OF CHANGING REEF ECOSYSTEM HEALTH**

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Understanding certified divers' perceptions of their Great Barrier Reef (GBR) experience is important to ensure a high-quality dive tourism product. The study examined what dive trip attributes were important to divers and how different dive markets perceived the GBR's environmental quality. The study borrows elements from the recreational specialization literature to explore differences in perceptions of the GBR between dive market segments. Results reveal that the more experienced "enthusiast" divers compared the GBR less favorably with regards to its environmental attributes, while "learners" were more favorable in their comparisons but also more concerned with the cost of their trip. The results suggest we consider marketing implications of changes in reef quality in light of a highly heterogeneous dive market.

Key words: Diving; Great Barrier Reef; Climate change; Environmental perceptions; Destination management

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### Introduction

This article investigates the issue of market heterogeneity in one of the most important diving destinations in the world, Australia's Great Barrier Reef (GBR) along the north coast of Queensland—a site also described as one of the world's most famous marine tourism attractions (Cater & Cater, 2007). The study examined what dive trip attributes were important to divers and how different dive markets perceived the GBR's environmental quality, a crucial question in the current

context of ecological uncertainty facing this important marine tourism destination.

The GBR supports an extraordinary diversity of plant and animal life with some 350 coral species, 1,500 species of fish, and over 4,000 species of mollusc (Spalding, Ravilious, & Green, 2001). While the total number of certified divers is unknown, it is estimated that there are between 5 and 7 million active divers worldwide (Thapa, Graefe, & Meyer, 2006), for whom the GBR represents a popular diving location. Indeed, the Queensland-based recreational diving market has been valued

at AUD\$1 billion from international visitors and AUD\$547 million from domestic divers and may total up to 740,000 dives within the Great Barrier Reef Marine Park (GBRMP) per annum (Tourism Queensland, 2004).

Kragt, Roebeling, and Ruijs (2009) acknowledged the ecological significance and economic importance of the GBR for industries operating in the area; tourism is the largest commercial activity in the GBRMP attracting an average of 1.9 million visitors annually, generating approximately AUD\$6 billion in income and supporting around 63,000 jobs for Queensland's economy (Wachenfeld et al., 2007). Somewhat surprisingly, however, little information exists regarding the level of diving experience of visitors to the GBR. The study presented here investigates the nature of the GBR's dive market and its perceptions of the quality of the natural environment, in the context of the coming changes to coral ecosystems.

#### The GBR as a Tourism Attraction: Future Challenges

Reef tourism faces many challenges as the ecological integrity of coral reef systems is threatened by a number of factors, most notably climate change and its associated issues of rising sea temperatures and ocean acidification (Hoegh-Guldberg, 2008). Bleaching disturbances are likely to become a chronic stress in many reef areas in the coming decades, and if coral communities cannot recover quickly enough, coral ecosystems are likely to be impoverished (Baker, Glynn, & Riegl, 2008). Predictions that coral reefs may disappear due to global warming are based on the claim that rate of environmental change is too rapid for corals to adapt because they have comparatively long regeneration times (Baird, Bhagooli, Ralph, & Takahashi, 2008).

As scientific reports of reef degradation become more frequent and alarming, the diving industry may well be concerned that actual and perceived ecological degradation of coral reefs are likely to affect tourist numbers and the economic sectors that rely on healthy reefs for their income (Kragt et al., 2009). This concern was voiced by industry representatives such as Col McKenzie, executive director of the Association of Marine

Park Tourism Operators, a trade organization that represents businesses on the GBR; as a response to reports over increasing algal cover on the reef, Mr. McKenzie commented "I do get concerned, however, when I continually hear stories saying the Barrier Reef is going to die. . . . We have to be really careful that we don't overplay the negative card and not simply from the point of view that it could hurt tourism" (cited in Mercer, 2010).

While divers may be able to correctly perceive the differences in the condition of some of the key biological attributes that affect their enjoyment (Uyara, Watkinson, & Cote, 2009), the subjectivity of such perceptions must, however, be taken into account. Dwyer and Kim (2003) point out that it is not so much the real but the perceived environmental quality that influences the buying decisions of the potential visitors. Environmental perceptions may vary with demographic factors such as nationality, gender, and experience (Baysan, 2001; Uyara et al., 2009).

Other studies confirm that divers with different levels of experience may evaluate their diving experience in a different way. For instance, Dearden, Bennett, and Rollins (2006) use diver specialization to determine the relationship between diver specialization, limits of acceptable change (LAC), and diving sustainability in Thailand. They apply the wildlife tourism framework developed by Duffus and Dearden (1990) to describe a shift in markets from expert/specialist visitors to novice/generalist visitors. Their results suggest that the dive trip experience, including setting and service features, was more important to novice divers than the dive itself, and an inverse relationship existed between diver specialization and overall trip satisfaction, so that more experienced divers were less satisfied with their experience.

#### Understanding the GBR's Dive Market: Applying the Recreation Specialization Approach

To evaluate perceptions of nature-based tourism attraction such as the GBR, it is important to understand the characteristics of that attraction's market, and to ensure that the attraction's overall "appeal" is superior to that of comparable alternatives available to potential visitors. Dwyer and Kim (2003) developed a model of destination

competitiveness that allows for comparisons between destinations and between tourism sector industries. The model indicates that there are numerous factors and many interrelationships that make up destination competitiveness. The results presented here form part of a larger study that adapted Dwyer and Kim's model to focus on aspects of the diving experience offered in Tropical North Queensland, while asking how diver characteristics affect the competitiveness of the reef tourism product offered in Tropical North Queensland.

Specialization research provides a basis to delineate subtypes of recreationists with differing goals, preferences, and behaviors and provides a useful tool to investigate different onsite behaviors, preferences, and perceptions of the GBR. Understanding these differences may assist recreation managers in designing a diversity of recreation opportunities aimed at meeting the specific needs of specialization subtypes. Therefore, the recreational specialization approach was used to segment scuba divers into groups based on experience levels to investigate variations in the divers' experiences and perceptions.

Bryan (1977) introduced the concept of recreational specialization as a method to understand the differences amongst recreational anglers. According to Bryan, recreational specialization refers to a continuum of behavior from the general to the specific as reflected by one's experience, skill, equipment, and economic commitment. People begin their involvement in leisure activities as novices and learn the basic skills and competencies of the activity (Kuentzel & Heberlein, 2008). Bryan's concept has since been adapted by other researchers focusing on leisure activities such as anglers (Chipman & Helfrich, 1988; Oh, Ditton, Anderson, Scott, & Stoll, 2005), mountaineers (Dyck, Schneider, Thompson, & Virden, 2003), canoeists (Kuentzel & McDonald, 1992), hikers and backpackers (Virden & Schreyer, 1988), boaters (Kuentzel & Heberlein, 2008), and birdwatchers (Hvene-gaard, 2002; Scott, Ditton, Stoll, & Eubanks, 2005; Scott & Thigpen, 2003).

It is assumed that recreationists progress along a continuum from one end to the other reflected by increasing participation, skill, and commitment (Bryan, 1977; Needham, Sprouse, & Grimm, 2009; Scott & Shafer, 2001). According to Virden and

Schreyer (1988), with increasing experience, skill, and commitment recreationists exhibit more specific setting and equipment preferences. This progression from novice to expert does not always need to occur however, as shown by Kuentzel and Heberlein's (2008) research of boaters. Their study used a life course analysis to investigate the relationship between changes in boating specialization and life course events (e.g., family changes, career changes, health issues, and new leisure interests). Kuentzel and Heberlein (2008) found that once boating skills were learned, it was difficult to find the initial exhilaration, aesthetics, and social bonding experiences with each successive boating trip. Boaters also grew tired of the activity and invested their time and energy into new skills, hobbies, and activities. Therefore, Kuentzel and Heberlein (2008) argue that experience, commitment, and lifestyle choices do not necessarily increase in a linear fashion.

Moreover, there seems to be little agreement among researchers about how best to measure the construct of specialization (Scott & Shafer, 2001; Scott & Thigpen, 2003). McFarlane (2001) acknowledges that further research is needed to resolve inconsistencies in defining the dimensions of specialization and the variables used to measure them. Needham, Vaske, Donnelly, and Manfreda (2007) state that both single-item and multidimensional approaches to specialization have been employed to segment users. Researchers generally agree that the construct is multidimensional, consisting of several dimensions with behavioral (i.e., years of experience), cognitive (i.e., skill), and affective (i.e., psychological attachment, involvement) components (Kuentzel & Heberlein, 2008; McFarlane, 2004; Oh & Ditton, 2006; Scott & Shafer, 2001).

Recent research by Scott et al. (2005), however, found that a single-item measure can be accurate in predicting specialization group membership. Using this single-item measure respondents were asked to classify themselves as a committed birder, an active birder, or a casual birder with a brief description given to clarify the different categories of classification. Needham et al. (2009) revisited this method focusing on fishing. Findings suggested that a relatively short and simple self-classification measure of specialization may perform just as well as more traditional complex mul-

tivariate techniques for measuring the concept. It must be noted that this self-classification measure consolidates several of the dimensions used in other studies into a single descriptive category.

Sorice, Oh, and Ditton (2009) also examined the validity of the single-item composite specialization measure focusing on recreational scuba divers. Responding divers were asked to classify themselves as casual, active, or committed divers. Each of these diver types was defined in a multidimensional manner to assist respondents in classifying themselves. Potential limitations of this approach were acknowledged as the accuracy was limited by how well the categories were defined. Subsequently, the measure performed well and had a high level of reliability across samples from the same population. Their study showed that a single-item measure can work with a different user group and a similar measure was adopted here.

### Research Aims and Questions

The aims of this study were to increase the understanding of the various experiences that certified divers have on the GBR by addressing questions regarding the characteristics of the dive tourism market of Tropical North Queensland, dive trip attributes that are of the greatest importance to certified divers, perceptions of environmental quality of the GBR in comparison to other diving destinations, and effects on destination choice and recommendations to family and friends. In order to fulfill these aims, the following questions were identified:

1. What are the characteristics of the GBR dive market based on the recreation specialization approach?
2. What trip attributes are of the greatest importance to certified divers, using the important-performance/satisfaction gap-based method (Tonge & Moore, 2007)?
3. How do certified divers perceive the environmental quality of the GBR in comparison to other diving destinations?
4. How do the perceptions of certified scuba affect their diving experience, destination choice, and recommendations to family and friends?

### The Study Method

The data collection focused on certified scuba divers departing from Cairns in Tropical North Queensland (Australia) to visit the GBR. The data were collected over 4 weeks in August 2009 from various operators to gain a generic sample of the dive market. Surveys were obtained from day trip boats ( $n = 50$ ), live aboard boats ( $n = 73$ ), the Reef Fleet Terminal ( $n = 137$ ), and a travel agency ( $n = 36$ ). The study employed convenience sampling using a self-administered questionnaire due to financial constraints and limited access to certified divers over the sampling period (Collis & Hussey, 2003). Time and financial constraints prohibited a lengthier sampling period, while the difficulties of asking visitors to complete the survey after their trip to reef limited the total sample size. Thus, accessing divers after their experience was identified as an issue requiring either extensive support from operators, many of whom either carry out their own surveys, or were involved in other social science research projects, or the ability to identify divers among the many hundred passengers disembarking at Reef Fleet Terminal at the end of the day, and convincing these people to complete a survey before they continued on to their accommodation, etc. A more rigorous sampling approach thus had to be abandoned after the first day of surveying.

The questionnaire was completed after the diving experience. On the dive boats, this was on the journey back to Cairns, while at the Reef Fleet Terminal, passengers departing the vessels were asked to complete the surveys, and lastly at the travel agency, people were asked if they had recently been scuba diving on the GBR and invited to complete the questionnaire if they had. The response rate was highest on vessels (90%), followed by the travel agency (85%) and lowest at the Reef Fleet Terminal (55%). Fewer people were willing to complete the survey at the Reef Fleet Terminal as some passengers had prearranged buses waiting to take them back to their accommodation while other passengers felt too tired after a whole day on the reef and were unwilling to participate.

### *Questionnaire Design*

A four-page questionnaire was developed including a mix of closed-ended and open-ended

questions as well as rating scale responses. Information collected in the surveys included the divers' sociodemographic characteristics, scuba diving history, the previous diving destinations that they had visited, aspects of the GBR experience that were important to respondents, perceptions of dive trip as well as environmental attributes, interest in diving artificial reefs, comparison of the GBR with other dive tourism destinations, and intentions to revisit the GBR. The survey was pre-tested on certified divers to ensure that completion time would not exceed 15 minutes and to verify that the wording of the questions was appropriate. Data were entered into SPSS 17.0 and analyzed using nonparametric statistical analyses as the data were not normally distributed.

In this study, two measures were initially trialed; the first was a subjective, cognitive measure, expressed as a self-rating of skills and development. This was then compared to other dimensions of experience (i.e., behavioral measures such as number of dives, years diving, and number of locations dived).

### *Limitations*

The survey instrument was handed out in English only, limiting respondents to those able to read and write in English and a certain degree of respondent bias cannot be ruled out. The study used convenience sampling for distribution of questionnaires due to limited access to passengers over the sample period. This sampling technique could also have caused a certain respondent bias. Finally, the study was limited to certified divers as a distinct market segment; while the majority of divers on the GBR are in fact uncertified divers (Coghlan & Prideaux, 2008), this group can be harder to identify as a market segment as their pattern of activity is more likely to be influenced by highly variable factors (disposable income on the day, availability of uncertified diving opportunities, etc.). Certified divers are thus more stable as a market segment according to the characteristics of a good market segment as described by Morrison (1996). However, the issue of nonresponse bias must also be considered, particularly for the data collected at Reef Fleet Terminal, where the response rate was much lower. A further limitation

was that the total size of the sample often did not allow for statistical comparisons between different subgroups based on specialization level.

## Results

### *Characteristics of the Dive Tourism Market in Tropical North Queensland*

The first aim of this study was to investigate the characteristics of the dive tourism market of Tropical North Queensland. Sociodemographics and diver experience variables were used to provide a descriptive profile of divers. Of the 296 participants, more than half (58.8%) were male and ages ranged from 18 to 69. The majority of respondents (53.7%) were between 21 and 30 years old. By nationality, 33.8% were from Europe followed by Australia and New Zealand (21.3%), the UK (19.6%), North America (17.6%), and respondents from emerging markets including South America, Africa, and the Middle East (7.8%).

In regards to total number of dives, 31.1% had 4–10 dives, 23.0% had completed 11–20 dives, and 21.6% had 21–50 dives. Diving experience was rated in years, of which 51.7% had been diving for 0–1 years, 18.9% had 2–5 years of diving experience, and 16.9% had 5–10 years of diving experience. In regards to certification level, slightly more respondents were open water divers (51.7%), followed by advanced divers (30.6%) and rescue divers (7.8%).

Scuba diving was an important travel motivation for the respondents' decision to travel to Tropical North Queensland with a mean score of 7.8 on a rating scale where 1 = not at all important and 10 = extremely important ( $SD = 2.5$ ). Respondents were also asked if the GBR was the main reason for coming to Tropical North Queensland with "Yes" being the answer for 65.1% of respondents. The question included an open-ended component where divers who answered "Yes" had the opportunity to express what aspect of the GBR was important to them. Once coded through a content analysis, common responses were: "marine life" (28.0%), "being able to see and experience something iconic" (20.6%), "coral" (17.6%), "diversity" (13.2%), and the "diving experience" (11.1%).

In regards to self-rated diving development,

43.9% of respondents categorized themselves as “beginners,” 31.1% as “intermediate,” and 25.0% as “advanced” scuba divers. Of the 296 respondents, 71.3% had dived coral reefs before and 36.3% had previously dived the GBR.

### *Divers Divided Into Groups Using the Recreational Specialization Approach*

Based on an objective measure of diving experience, the categories “learners,” “dabblers,” and “enthusiasts” were created. Learners are those people learning the activity, and in this study are certified scuba divers with up to 10 dives. Dabblers are those people occasionally taking part in their chosen activity (Keeling, 2006) and were organized into scuba divers with 11–60 dives. Enthusiasts are people that take part in an activity on a regular basis with a keen interest in it (Keeling, 2006) and here include those respondents with more than 60 dives.

With regards to respondents’ self-rating, a total of 89% of beginners fell into the learner category, while 79% of advanced divers were classified as enthusiasts. Dabblers, meanwhile, were divided across beginners (33.6%), intermediate divers (50%), and advanced divers (16.4%). This final point is noteworthy as it points to a level of ambiguity surrounding this group of divers, for whom a multivariate measure of specialization such as the one suggested by Hawkins, Loomis, and Salz (2009) may be more usefully applied. A chi-square confirmed the overlap between self-categorization and categorization based on number of dives ( $\chi^2 = 207.39$ ,  $p < 0.001$ ). Furthermore, a Spearman’s rank-order correlation between the number of dives and certification level showed a significant positive relationship ( $r = 0.723$ ,  $p < 0.001$ ). The same test was performed on total number of dives and years of diving, which showed a slightly weaker positive relationship ( $r = 0.579$ ,  $p < 0.001$ ). Self-rated diving development is based on a response form from 1 (beginner) to 3 (advanced).

The Kruskal-Wallis test revealed a statistically significant differences in age across the different diver groups ( $H = 34.84$ ,  $p < 0.001$ ), with “enthusiasts” recording higher mean scores than the “learners” and “dabblers.” As Table 1 shows, the

mean age of respondents increases with the level of specialization. Other behavioral variables also showed statistically significant differences; the number of previous visits to the GBR differed according to experience ( $\chi^2 = 42.41$ ,  $p < 0.001$ ); “enthusiasts” (68.8%) were more likely to have dived the GBR before than “dabblers” (33.1%) and “learners” (18.5%). The same was revealed in regards to whether scuba divers had dived other coral reefs before ( $\chi^2 = 39.37$ ,  $p < 0.001$ ). “Enthusiasts” (90.6%) were more likely to have visited other coral reefs previously, followed by “dabblers” (77.9%) and “learners” (47.8%). Comparing the importance of the dive trip in the scuba divers’ decision to come to Tropical North Queensland also revealed significant relationships; using the Kruskal-Wallis test ( $H = 10.66$ ,  $p < 0.05$ ) it was found that the diving trip was more important in their decision to come to Tropical North Queensland for “enthusiasts” (mean = 8.2) followed by “dabblers” (mean = 8.1) and “learners” (mean = 7.1).

### *Dive Trip Attributes of the Greatest Importance to Certified Divers*

The second aim of this study was to identify what dive trip attributes are of greatest importance to certified dives and therefore have the potential to influence the competitiveness of the attraction. A comparison of mean scores between the importance and the performance of dive trip attributes was conducted. Table 2 and Figure 1 show the importance and performance of 16 attributes ranked from highest to lowest importance for environmental, service, and setting attributes. Performance tended to be lower on all of the environmental attributes. Setting and service performance were also low, with some exceptions such as customer service, boat comfort, meals on board, and length of passage to dive site. A pairwise comparison of the means for importance and satisfaction/performance reveals statistical differences between all but three of the attributes, namely, the crew, dive briefings, and dive buddies.

It is interesting to note from Table 2 that, compared to importance, respondents were less satisfied with the diversity of marine life, underwater scenery, quality of coral, knowledge of dive mas-

Table 1  
Comparison of Respondents' Demographics and Previous Diving History  
for the Three Different Categories of Divers

|                     | Learners<br>( <i>n</i> = 92/31.1%) | Dabblers<br>( <i>n</i> = 140/47.3%) | Enthusiasts<br>( <i>n</i> = 64/21.6%) |
|---------------------|------------------------------------|-------------------------------------|---------------------------------------|
| Gender              |                                    |                                     |                                       |
| Male                | 62.0%                              | 52.9%                               | 67.2%                                 |
| Female              | 38.0%                              | 47.1%                               | 32.8%                                 |
| Age in years (mean) | 28.3                               | 30.6                                | 37.7                                  |
| Nationality         |                                    |                                     |                                       |
| Australia & NZ      | 16.3%                              | 15.7%                               | 40.6%                                 |
| Europe              | 35.9%                              | 34.3%                               | 29.7%                                 |
| UK & Ireland        | 26.1%                              | 18.6%                               | 12.5%                                 |
| North America       | 16.3%                              | 23.6%                               | 6.3%                                  |
| Emerging markets    | 5.4%                               | 7.9%                                | 10.9%                                 |

ters, quality of the rental equipment, safety measures, and in-water visibility. On the other hand, in dive trip features such as customer service, boat comfort, meals, and length of passage to dive site, performance was rated higher than importance.

The Kruskal-Wallis test showed differences in the interest of diving artificial reefs ( $H = 18.30$ ,  $p < 0.001$ ). "Enthusiasts" seem to have the highest interest in diving artificial reefs (mean = 7.41) fol-

lowed by "learners" (mean = 6.11) and "dabblers" (mean = 5.86). In an open-ended question, respondents were asked how the dive trip could be improved to increase their overall satisfaction and 129 certified divers took the opportunity to reply to this question. "Cheaper" or other kinds of discounts were mentioned by 16.3% of respondents, followed by "less people onboard" (13.9%), "better weather" (11.6%), "more education/interpreta-

Table 2  
Importance and Performance of Dive Trip Attributes

| Environmental Attributes  | Importance | Performance | Difference | Z-Score &<br><i>p</i> -Value (Wilcoxon Test) |
|---------------------------|------------|-------------|------------|--|
| Diversity of marine life  | 4.63       | 4.29        | -0.34      | -5.753*                                      |
| Underwater scenery        | 4.59       | 4.28        | -0.31      | 6.031*                                       |
| Quality of the coral      | 4.58       | 4.16        | -0.42      | -7.179*                                      |
| Visibility                | 4.39       | 3.86        | -0.53      | -7.422*                                      |
| Setting Attributes        | Importance | Performance | Difference | <i>t</i> -Value                              |
| Rental equipment          | 4.51       | 4.21        | -0.30      | -4.897*                                      |
| Dive buddy                | 4.2        | 4.19        | -0.01      | -0.252                                       |
| Cost of trip              | 3.95       | 3.59        | -0.36      | -5.118*                                      |
| Comfort of the boat       | 3.81       | 4.07        | 0.26       | -4.489*                                      |
| Meals on board            | 3.65       | 4.00        | 0.35       | -5.773*                                      |
| Length of passage to site | 3.12       | 3.44        | 0.32       | -4.521*                                      |
| Service Attributes        | Importance | Performance | Difference | <i>t</i> -Value                              |
| Knowledge of dive masters | 4.58       | 4.35        | -0.23      | -4.764*                                      |
| Crew                      | 4.48       | 4.41        | -0.07      | -1.103                                       |
| Safety measures           | 4.42       | 4.1         | -0.32      | -5.753*                                      |
| Dive briefing             | 4.32       | 4.28        | -0.04      | -0.798                                       |
| Customer service          | 4.13       | 4.28        | 0.15       | -2.889*                                      |
| Educational facilities    | 3.72       | 3.56        | -0.16      | -2.766*                                      |

\*Significant at  $p = 0.01$  level.



tion" (11.6%), "more time on the reef" (8.5%), and "longer dive time" (7.7%).

### *Perceived Comparison of GBR to Other Diving Destinations*

The third aim of the study was to evaluate how certified divers perceived the environmental quality of the GBR in comparison to other diving destinations. Figure 2 shows that the GBR was rated as largely similar to other diving destinations. The two attributes where it was perceived as better include "diversity of marine life" and "underwater scenery." In regards to "diversity of marine life," the GBR rated better compared to the Caribbean, the Indian Ocean, and the South Pacific. "Underwater scenery" of the GBR was also rated better compared to the Caribbean and the Indian Ocean. Compared to the other diving destinations the GBR rated similar in "accessibility to dive sites" and "visibility." The GBR's "cost of the trip" seemed to be rated as the worst criteria compared to all other diving destinations. "Damaged and bleached coral" and "impacts on reef in general" of the GBR were also largely perceived as similar with other diving destinations.

While the small sample size does not permit a statistical analysis of the results, it was also noted that certain features were rated differently by the

various groups of divers; for instance, "underwater scenery" was rated more favorably by learners than any other group, while enthusiasts' perceived the GBR to have more "damaged/bleached coral" (45.7%), more "impacts on the reef" (46.7%), and worse "visibility" (37.0%) compared to other diving destinations. Meanwhile "enthusiasts" also rated "accessibility" (32.6%) and "cost of trip" (17.4%) better than other diving destinations. "Learners" indicated that they felt the GBR's "diversity of marine life" (44.2%) to be better than other destinations while "cost" was rated as worse (60.5%) compared with other diving destinations worldwide.

### *Effect of Perceptions on Diving Experience, Revisiting Behavior, and Recommendations*

The fourth aim of the study was to understand how the perceptions of certified scuba divers affect their revisiting behavior and recommendations made to friends, family, and other certified divers. First, respondents were asked what features of their day had had a negative impact on their experience. Divers mainly criticized "damaged coral" (26.7%), "dead coral" (24.0%), "divers disturbing marine life" (21.6%), "crowding" (20.9%), and "poor visibility" (19.6%). Next, divers were asked if they were concerned if the current global environmental changes would have consequences

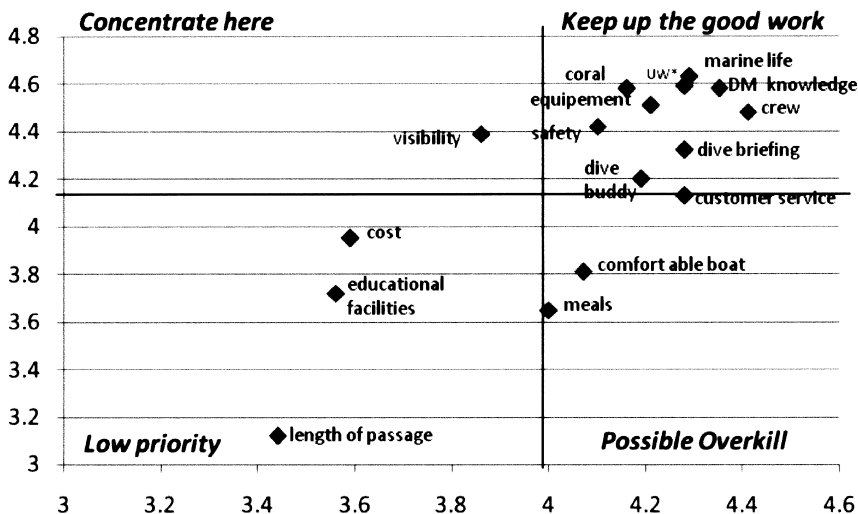


Figure 1. Importance(y-axis) and performance (x-axis) analysis of dive trip attributes.

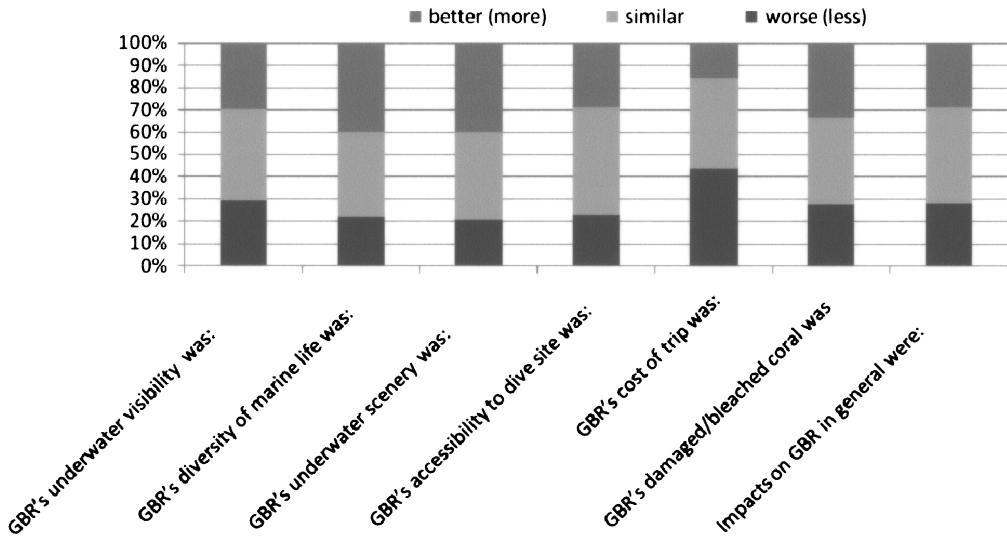


Figure 2. Comparison of the GBR in the various attributes.

for dive tourism. Of the 296 responding scuba divers, 73.9% were concerned with the current change. This question had an open-ended component to give respondents the opportunity to express why and how dive tourism would be affected. Content analysis identified that impacts on “coral life” seemed to be of the greatest concern with 29.6%, followed by impacts on “marine life” (11.8%). Using a rating scale from 1 (very low quality) to 10 (very high quality), environmental quality of the GBR was generally rated as high with a mean of 7.70. Human impact was rated as low with a mean of 4.94.

Overall, the expectations of certified scuba divers were either met (36.5%) or were somewhat above expectations (34.8%). Respondents were also asked whether they would dive the GBR again if climate change severely affected its quality. Almost half of respondents were unsure (45.9%) while 36.5% said they would return. The majority of respondents (89.9%) indicated they would revisit the GBR based on their experience and 78.7% said they would return to the same diving company, which probably indicates they were not dissatisfied with their experience. Moreover, respondents indicated they would recommend the GBR to family, friends, and prospective visitors (95.3%) as well as other certified divers (93.2%).

## Discussion

The aims of this study were to increase our understanding of certified divers' GBR experiences by addressing questions regarding the characteristics of the dive tourism market of Tropical North Queensland, attributes that are of the greatest importance to certified divers, perceptions of environmental quality of the GBR in comparison to other diving destinations, and effects on destination choice and recommendations to family and friends. There appeared to be a strong awareness among all divers of the issues that affect coral reefs and the negative impacts they might have on the diver experience and, for many, they would not necessarily return to the GBR if climate change severely affected the quality of the GBR, adding weight to results from other studies such as Uyarra et al. (2005) and validating industry concerns over widespread media reports of reef degradation.

In the face of the environmental degradation faced by reef ecosystems, destination management organizations must investigate how they may maintain the strength of this market segment in the region. The marketing efforts of organizations, such as Tourism Tropical North Queensland, and individual operators will need to adapt to the

changing conditions on the reef. Studies that are able to identify subtypes of recreational divers with differing goals, preferences, and behaviors may assist in designing adaptation plans aimed at meeting the specific needs of specialization subtypes. In this case, the authors identified at least three groups of divers who are likely to respond differently to changes in reef conditions, trip cost, and service quality measures.

For instance, while “enthusiast” divers currently rate the diving opportunities as their most important motivation for visiting Tropical North Queensland, this is the same group who feel that the GBR has more damaged coral, greater human impacts, and worse visibility than other destinations. It may be that these divers begin to seek out alternative diving experiences (cave diving, ice diving, and so forth) at the expense of reef diving or, alternatively, they may be attracted to new diving experiences offered by artificial reefs, or novel experiences of the sort offered by the underwater sculpture park in Grenada. The potential of artificial reefs or underwater parks as suggested by Van Treeck and Schumacher (1998) might show potential especially for learners and enthusiasts.

The results of this study also highlight the possibility for the industry to use increased quality of service to compensate for less pristine reef sites. While elements of the experience such as visibility, health of the coral, and marine biodiversity are difficult, if not impossible, for operators to manage directly, other features such as knowledge of the dive masters, the quality of rental equipment, and safety measures were identified as areas where performance did not match the importance that respondents placed upon them. Greater investment in these areas may bolster the resilience of the diving experience to some extent, particularly for the large generalist market (the “dabblers”) that visit the GBR.

The cost of the trip and marine education are two final areas that fall directly under the control of operators and showed some interesting trends in this study. First, it was interesting to note that learner divers were most likely to feel that the cost of the trip rated poorly compared to other destinations. This poses an interesting challenge to operators should the dive market shift towards less experienced divers, who while they appear to be

more favorable in their comparisons with other diving destination, nevertheless perceive cost to be an issue with their diving experience on the GBR. Finally, marine education was noted as a response to the question what would increase the respondents satisfaction. Again, “learners” were particularly receptive to the information provided by dive masters, making an investment in the marine knowledge of crew a viable strategy to boost customer satisfaction. Dearden et al. (2006) raised the issue of increasing trends towards a generalist market for whom setting and service features became increasingly important over the dive experience itself. These results tend to support these earlier findings with the addition of cost issues and differences in perceived value for money between different groups of divers.

In conclusion, understanding the heterogeneous nature of the GBR diving industry and analyzing how different diver groups evaluate their GBR experience and compare it to other major diving destination in terms of the selected attributes is important to know from a marketing and destination management point of view. The information gained could help dive operators to develop a better marine tourism product that is consistent with the needs and wants of certified scuba divers visiting to the GBR. Because the GBR was rated somewhat similar to other diving destinations, there might be an emerging need to depart from the current message that the GBR is more pristine and better than other reefs.

As shown in the study, the different types of divers may be more or less sensitive to negative features on the reef, the way it is managed, and other features of their diving experience that fall under the direct control over the operator. Diving enthusiasts, who have the most extensive experience of diving other reefs, did not rate the environmental quality of the GBR as highly as other divers, yet they did appreciate other features such as the comfort of the vessels, and the cost of diving. The converse was true of less experienced divers. This has consequences for travel decisions, such as whether to visit one dive destination over another or whether to recommend a particular dive destination to other divers.

The particular permitting system established by the GBR Marine Park Authority provides the op-

portunity for operators catering to different markets to separate themselves geographically, thus avoiding some of the issues highlighted by Dearden et al. (2006). A live-aboard dive operator with a product tailored to specialized enthusiast divers is less likely to carry or encounter generalist divers. This provides additional opportunities to adjust service and setting attributes as environmental attributes vary, if they are provided with accurate information on diver perceptions and needs. For instance value-adding techniques may provide a good strategy for operators who target less experienced divers, and may also boost the satisfaction of more experienced divers. These small issues may become increasingly important as reports of climate change and reef damage continue to appear in the media, potentially affecting the experience of divers visiting the GBR.

#### Biographical Notes

Anja Pabel completed her Bachelor of Business majoring in Tourism Management at James Cook University in 2008. As part of her honours research project, she investigated dive tourism of the Great Barrier Reef. Research interests include marine tourism, adventure tourism, and backpacker tourism. She is a certified diver herself and enjoys discovering what the Great Barrier Reef has to offer as frequently as she can.

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*Coordinating Editor: Philip Dearden*

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