

Place attachment of visitors to the southern Ningaloo coast

Report prepared for the Western Australian Department of
Environment and Conservation

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Executive Summary

This report presents the results of a survey of visitors to three campgrounds adjacent to the southern part of Ningaloo Marine Park, Western Australia. The survey focused on measuring place attachment as well as visitor perceptions of possible management actions and their stated intentions to undertake a range of pro-environmental behaviours. Questions pertaining to visit and visitor characteristics were included and are also reported here.

Place attachment was described as place dependence, place identity, social bonding and everybody's happy. The second element – place identity – was the most strongly expressed by those surveyed. Social bonding was the least strongly expressed. Participants were generally supportive of management actions relating to the provision of additional information, and less supportive of actions pertaining to the provision of additional facilities. Regarding behavioural intentions, visitors were more inclined to undertake on-site than off-site pro-environmental behaviours.

From these results, the following recommendations are provided for the management of Ningaloo Marine Park and the adjacent campgrounds:

1. Use an enhanced understanding of the effects of place identity, place dependence and everybody's happy on visitors' perceptions and expectations in the implementation of any management changes to these campgrounds and to the use of and access to the Marine Park.
2. Provide additional visitor information on how to further protect the natural environment when undertaking marine-based recreation activities.
3. If additional infrastructure is provided, keep it to a minimum.
4. Acknowledge and build on the environmentally responsible behavioural intentions of visitors.
5. Clearly communicate the World Heritage status of the Ningaloo coast, including Ningaloo Marine Park.

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1 Introduction

This report presents the results of a survey of visitors camping along the southern Ningaloo coast, specifically at three campgrounds – Coral Bay, 14 Mile Camp on Warroora Station and 3 Mile Camp on Gnaraloo Station (Fig 1). The survey was part of a PhD project examining the place attachment of visitors and its effects on pro-environmental behavioural intentions and support for management actions. Manuscripts pertaining to the relationships between place attachment and intentions and support are listed in Appendix 1. This report focuses on the results obtained from the survey, presented by campground and as a total cohort. Below is a brief overview of place attachment to provide context as to the research project and survey questions.

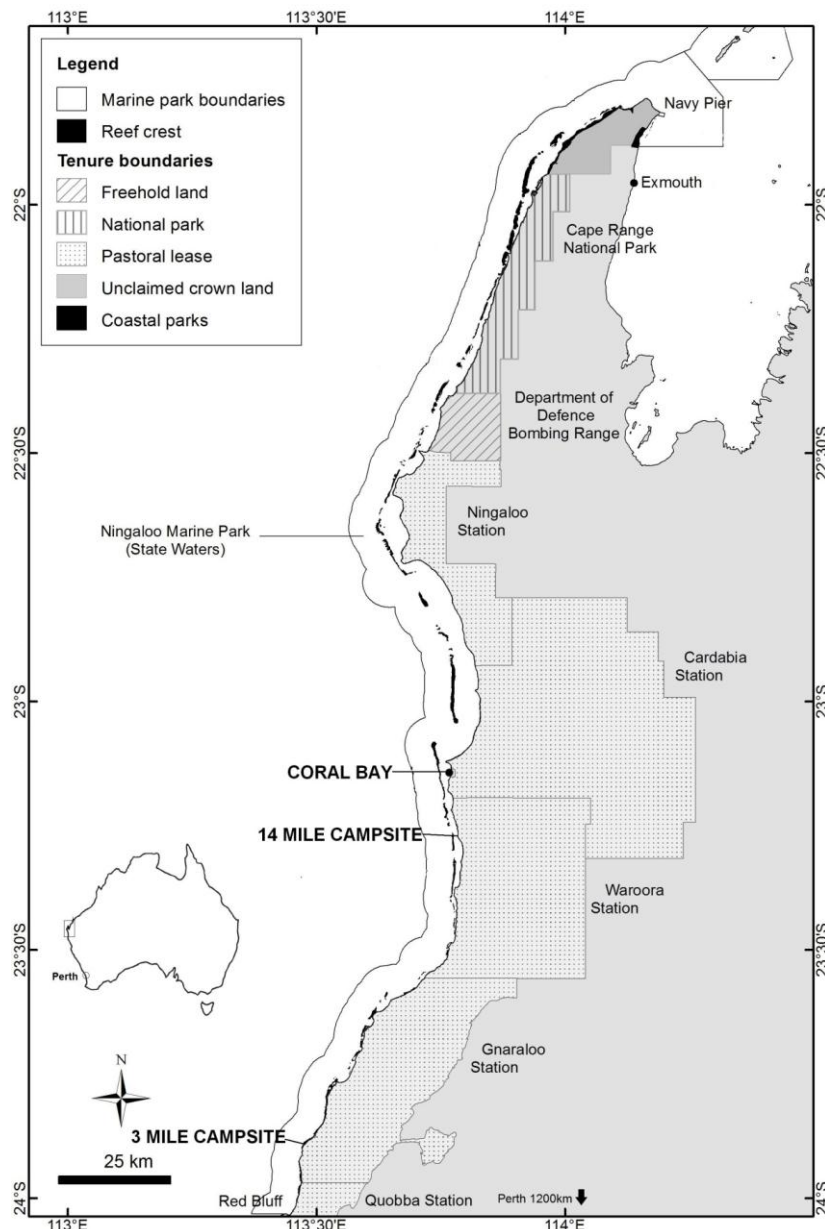


Figure 1: Map of Ningaloo Marine Park and reef crest showing study site locations.

1.1 Place attachment

Place attachment has been the subject of a rich, growing body of research in natural resource management, with a particular emphasis on visitors to terrestrial national parks and forests. Principally developed within the environmental psychology field (Farnum, Hall, & Kruger, 2005; Trentelman, 2009; Williams, Patterson, Roggenbuck, & Watson, 1992), place attachment describes the bonds between a person and a place (Farnum, et al., 2005; Trentelman, 2009; Williams & Vaske, 2003). This concept has been used by natural resource managers to refine their understanding of visitors' setting preferences, management preferences and activity participation (Kyle, Absher, & Graefe, 2003; Kyle, Graefe, Manning, & Bacon, 2004; Warzecha & Lime, 2001).

Visitors to protected areas expect to have positive experiences when they visit specific settings, and if these expectations are fulfilled, over time an attachment develops as they start to give the setting value (Kyle, Graefe, & Manning, 2005; Relph, 1976). Place attachment is generally expressed as a positive attitude towards a place, extensive knowledge of the setting and frequent visitation (Smaldone, 2006; Williams, et al., 1992; Williams & Vaske, 2003). The strength or level of place attachment has traditionally been measured through two dimensions – place identity and place dependence – however additional dimensions have also been developed and tested with the aim to measure the social and emotional aspects that go into forming an attachment to a place.

The first dimension, place identity, generally involves a psychological investment with a place so that it becomes the repository for certain emotions and relationships providing purpose and meaning to life (Brooks, Wallace, & Williams, 2007; Williams & Vaske, 2003). Through a complex pattern of conscious and unconscious ideals, beliefs, preferences, feelings and values, the location offers the individual the opportunity to both express and affirm their own identity (Hammit, Kyle, & Oh, 2009; Kyle, et al., 2005; Kyle, Graefe, Manning, et al., 2004; White, Virden, & van Riper, 2008). Others play an important role in shaping an individual's place identity through their relationships with the individual (Brooks, et al., 2007).

The second dimension, place dependence, is a more functional or goal-directed form of attachment (Kyle, et al., 2005; Williams & Vaske, 2003). It relates to a dependence on the setting to undertake a specific activity or achieve a particular goal, given the range of alternative settings that are available (Trentelman, 2009; White, et al., 2008; Williams &

Vaske, 2003). Place dependence is generally embodied in the setting's physical attributes (Williams & Vaske, 2003), with the individual determining that no other setting will do as well as this one in satisfying their needs (Trentelman, 2009).

Social aspects are increasingly being used in place attachment studies, generally in the form of social bonding. Social bonding is the dimension resulting from meaningful interactions with family, friends, or significant others bounded by the setting (Hammit, Backlund, & Bixler, 2006; Hidalgo & Hernandez, 2001; Kyle, et al., 2005). As places provide the context in which shared experiences and interpersonal relationships occur (Kyle, et al., 2005; Kyle, Mowen, & Tarrant, 2004; Mesch & Manor, 1998), visitors often become attached to these social relationships (Low & Altman, 1992). For some individuals, social bonds occurring within a place are the primary source of value, with the importance of the setting tied to memories and experiences shared with significant others (Kyle, Graefe, & Manning, 2004).

The importance of emotions in forming and maintaining attachment is noted by a number of authors (e.g. Giuliani, 2003; Halpenny, 2010; Manzo, 2003). It has been suggested that these emotional bonds develop to satisfy fundamental human needs, such as a general sense of well-being (Ramkissoon, Weiler, & Smith, 2012). An earlier qualitative phase of this PhD study aimed at identifying the meanings that visitors attach to Ningaloo. A significant emotional meaning was identified relating to the notion of individual contentment as a result of group enjoyment. A key aspect was all family members being entertained in the one location as recreational activities were in close proximity to each other. While the original impetus for a group going to Ningaloo was for one member to participate in their chosen activity (e.g. surfing or fishing), others were not disadvantaged and were equally happy to be there as they too enjoyed Ningaloo. As this was a strong emotional link for visitors at Ningaloo, it was explored further in this survey's conceptualisation of place attachment and was termed "everybody's happy".

2 Visitor Surveys

Visitor surveys have been widely used in protected area and natural resource management to collect information on visitors, including their activities, expectations and satisfaction with natural areas (Newsome, Moore, & Dowling, 2002). They have also been utilised in place attachment research to determine the strength of attachment via place identity and place dependence scales, as well as testing for relationships between place attachment and visitor characteristics (Bricker & Kerstetter, 2002; Trentelman, 2010; Moore & Graefe, 1994; Williams & Roggenbuck, 1989).

Most place attachment research involving surveys have utilised mail-back approaches, either with visitors given a questionnaire on-site to mail back to the researchers (e.g. Eisenhauer et al. (2000)) or a mail-out to residents surrounding a protected area (e.g. Wynveen, Kyle and Sutton (2010)). A survey distributed and completed on-site was the preferred method for this study. Reasons include the high response rates associated with on-site methods (de Vaus, 1990; Newsome, et al., 2002), and the cost involved in travelling to the remote setting to disperse the surveys in addition to cost of a mail-back approach. In addition, a number of visitors to Ningaloo Marine Park originate from interstate or overseas (C. Smallwood, 2009) and it would have been difficult to capture the perceptions of these visitors once they had left the campgrounds.

2.1.1 Measuring place attachment

Place attachment is a hypothetical construct that is not directly observable, but can be inferred based on measured responses to a number of place attachment scales (Jorgensen & Stedman, 2001). There is also existing research that suggests that place attachment is responsive to psychometric scaling in large scale social surveys (Jorgensen & Stedman, 2001; Williams & Vaske, 2003). The survey (Appendix 2) aimed to measure the three dimensions of attachment identified from the place literature and included place identity, place dependence and social bonding. A fourth emotional dimension termed “everybody’s happy”, identified in an earlier phase of this study, was also included and a set of scale items was developed to measure it. Survey development was guided by previous approaches through the combination and modification of questions from other studies (as indicated in Table 1 below) and factors and site specific characteristics for the Ningaloo area.

Each of the four dimensions (place identity, place dependence, social bonding and everybody’s happy) was measured using four to six statements, totalling 20 statements. These

statements, listed in a random order, were administered via five-point Likert scales with participants asked to indicate their level of agreement, with 1 being “strongly disagree” and 5 “strongly agree”. The statements measuring the place identity and place dependence constructs (Table 1) were based on those developed by Williams and Roggenbuck (1989) which have consequently been used in numerous place attachment studies (e.g. Anderson & Fulton, 2008; Halpenny, 2010; Hammit, Kyle & Oh, 2009; Kyle et al., 2005). They are regarded as valid and reliable measures of place attachment (Kyle, Mowen, et al., 2004; Williams & Vaske, 2003).

The statements used to measure social bonding came from two sources to reflect the meanings expressed by participants in an early phase of this PhD research. To reflect the relationships made and retained at the campgrounds, two statements measuring social bonding, developed by Kyle et al. (2004), were included in the survey. As a feeling of community was also expressed by participants in this early phase, statements from a scale developed by Wilkinson (2008) from his community research were also included to measure the social bonding construct. For the “everybody’s happy” dimension, statements were developed to reflect the sentiments expressed in the earlier qualitative phase.

Although the place identity, place dependence and social bonding dimensions have all been previously shown to measure place attachment, three questions were also included to measure the convergent validity of the place statements and hence to confirm that attachment was in fact being measured. These related to number of visits in the previous 12 months, level of familiarity with the site and whether the site was special (Williams & Vaske, 2003).

Participants who visit more frequently, have higher levels of familiarity with the site and consider it special are likely to have higher place scores, reflecting higher place attachment.

For the majority of the place identity, place dependence and social bonding statements, the word “Ningaloo” was used as the place name (Table 1). For the social bonding statements, reference was made to other coastal settings. For example, Kyle, Mowen and Tarrant (2004) used the social bonding statement “My friends/family would be disappointed if I were to start visiting other settings and facilities” (p. 446), which was modified here to include reference to the coastal setting (Table 1).

Table 1 Place statements used in survey and their source

Place dimension	How measured	Source
Validity items	Number of visits in previous 12 months	Williams and Vaske (2003)
	Level of familiarity with the site	
	Whether the site is a special place	
Place identity	I feel that Ningaloo is a part of me	Williams and Vaske (2003)
	I am very attached to Ningaloo	
	I identify strongly with Ningaloo	
	Ningaloo is very special to me	
	Visiting Ningaloo says a lot about who I am	
	Ningaloo means a lot to me	
Place dependence	Ningaloo is the best place for what I like to do	Williams and Vaske (2003)
	The things I do at Ningaloo I would enjoy doing just as much at a similar place	
	No other place can compare to Ningaloo	
	Doing what I do here at Ningaloo is more important to me than doing it at any other place	
	I wouldn't substitute any other area for doing the type of things I do at Ningaloo	
	I get more satisfaction from visiting Ningaloo than any other place	
Social bonding	My family and friends would be disappointed if I were to start visiting other coastal places other than Ningaloo	Kyle, Mowen and Tarrant (2004)
	If I were to stop coming here to Ningaloo, I would lose contact with a number of friends	
	A feeling of community runs between me and the other campers here at Ningaloo	Wilkinson (2008)
	The friendships and association I have with other people here at Ningaloo mean a lot to me	
Everybody's happy	Ningaloo is important to me because my family /group of friends enjoy it	Developed as part of this study
	I rely on Ningaloo to provide an enjoyable experience for my family /group of friends	
	There is no other place like Ningaloo where members of my family /group of friends can enjoy their own experiences in the one place	
	Holidays to Ningaloo are important to us as a family /group of friends because everyone can enjoy themselves	

2.1.2 Measuring additional variables

Participants were also asked to indicate their level of agreement with a list of management actions via a five point scale anchored with “strongly disagree” (1) and “strongly agree” (5). Management actions (App. 2, question 8) were derived from the management plan for Ningaloo Marine Park (DEC, 2008), the Ningaloo Coast Regional Strategy (WAPA, 2004) and participants’ responses to an earlier part of this study where they were discussed as part of open-ended interviews. Additional management actions, including actions relating to minimum impact snorkelling and provision of moorings, were devised by the researchers to

ensure the inclusion of marine activities. All the listed management actions were purposefully left generic, where possible, to ensure applicability to all three of the campgrounds.

People that are attached to places are likely to have a sense to commitment and responsibility towards them (Walker & Chapman, 2003) often developed through on-going interactions with the setting (Halpenny, 2010). Pro-environmental behaviours towards a place may be partially predicted by an individual's previous experience with a place and the resulting attachment that develops (Halpenny, 2010). However, measuring actual behaviours is difficult with many researchers using stated behavioural intentions as a substitute. This is based on the theory of reasoned action, that the best predictor of a behaviour is the stated intention to perform that behaviour (Fishbein & Ajzen, 1975). Therefore, behavioural intentions were used in this survey to determine how likely visitors would be to engage in behaviours at or away from the campgrounds. These focused on three categories of intentions – behaviours performed by themselves on-site; whether they would tell others to undertake these behaviours on-site; and their varying levels of commitment to the conservation of Ningaloo away from the study campgrounds (App. 2, Questions 9, 10 & 11). These categories were hypothesised as requiring different levels of commitment, from lower commitment for personal onsite activities through to higher commitment being evident in intentions to undertake activities offsite. Weaver and Lawton (2011) have similarly described this as a progression from lower to higher levels of investment.

The listed behavioural intentions were devised to be relevant to the campgrounds and guided by studies by Halpenny (2010) and Walker & Chapman (2003) (Table 2). The first question on intentions related to behaviours likely to be performed on-site. They related to picking up litter, not feeding wildlife and conserving water as well as learning about Ningaloo Marine Park. Visitors were then asked whether they would be tell others to undertake (or not undertake) these behaviours as an extension of their level of commitment to protecting their special place. The final category of behaviours aimed to determine their intent to undertake behaviours to protect their special place off-site. Behaviours included signing or distributing petitions, donating money to conservation projects and volunteering to undertake conservation programs. The highest level of commitment was regarded as underpinning these off-site behaviours. All the behaviour questions used the same five point scale ranging from “wouldn't consider it”(1), “would consider it”(4) and “already do”(5).

Table 2 Supplementary variables included in survey and their source

Supplementary variables	Source
Management actions	Ningaloo Marine Park Management Plan Ningaloo Coast Regional Strategy Emergent from qualitative stage Developed by Researcher
Pro-environmental intentions	Halpenny (2010) Walker and Chapman (2003) Developed by Researcher
World Heritage questions	Developed by Researcher in consultation with Department of Environment and Conservation
Socio-demographic variables	Department of Environment and Conservation VISTAT Visitor Survey
Reasons for visiting	Four emergent categories from qualitative stage

At the time this research was conducted, the Ningaloo Coast had been nominated (but not yet listed) for inclusion on the World Heritage List. At the request of the Department of Environment and Conservation, questions were included to ascertain visitors' level of knowledge regarding the nomination and what the potential effect would be on their future visits when the area was listed.

Questions were also included in the survey to obtain socio-demographic data on the visitors and their visit characteristics based on the current DEC visitor survey questions. Visitor characteristics included gender, age group, level of education and their usual place of residence. Visit characteristics included reasons for visiting, number of adults and children per group and type of group.

2.2 Pre-testing of survey

Pre-testing of the survey instrument was undertaken prior to data collection. A total of 19 participants who had previously visited Ningaloo Marine Park, including those who had visited once only and more than once, completed the pilot test. These participants included post-graduate and under-graduate students from the researcher's university as well as academic staff. The survey was also provided to others outside of the university environment. Once participants had completed the survey, they were asked by the researcher how long it took them to complete, whether there were any questions that they did not understand and whether they had any other comments regarding the survey. In addition to this pilot-testing, the survey was also sent to a number of staff within the Department of Environment and Conservation for comment. This included the Marine Policy and Planning Branch, the

Principal Research Scientist for the Marine Science Program, the Social Research Unit Coordinator and the Visitor Services Coordinator of the Exmouth District Office.

All comments provided by the DEC staff and the participants were taken into consideration and resulted in slight modifications to the survey instrument. Three questions relating to frequency of visitation were condensed to one question relating to visitation in the last 12 months. Some of the management actions were removed or adapted to become less ambiguous. No changes were made to the place attachment statements.

2.3 Data collection

The surveys were distributed to visitors on-site at the three campgrounds during a four week period (26 June 2010 to 22 July 2010). This coincided with the July school holiday period (3-19 July 2010) plus one week either side. This is the peak visitation period for Ningaloo Marine Park (Beckley, Smallwood, Moore, & Kobryn, 2010; Smallwood, Beckley, Moore & Kobryn, 2011) and was chosen to ensure as large a sample size as possible in the shortest amount of time, given the remote location of the campgrounds. Each of the three campgrounds was visited at least once each week during this period. As many visitors to 14 Mile Campground are there for three months or more, there was unlikely to be many “new” visitors after the initial sampling took place. As such, a single day each week was deemed sufficient for this site. Coral Bay and 3 Mile Campground were surveyed multiple times each week.

Visitors over the age of 18 (legal Australian adult) were approached and asked if they wish to complete a survey, with both first time and repeat visitors asked to participate. The participant was provided with a survey and asked to complete it with the researcher returning after a 10-15 minute period to collect the completed survey. Each survey was marked according to the date, campground and individual survey number. The campsite number was also recorded to avoid survey distribution duplication. Those who declined to participate were also recorded.

2.4 Data analysis

The data presented in this report were analysed using descriptive statistics, namely the mean and standard deviation for the scale-based items, and frequencies (including percentage frequencies) for non-scale items. These were calculated for each of the three campgrounds as well as for the whole cohort.

3 Survey Results

A total of 389 visitors were approached with 372 usable surveys obtained, resulting in a response rate of 95%. Visitor and visit characteristics of the participants are described below. Information pertaining to the place attachment statements, perceptions of management actions and pro-environmental intentions follow. To conclude this section, a comparison of results across the three campgrounds is provided.

3.1.1 Visitor and Visit Characteristics

Overall, there were more female (60%) than male participants (40%) (Fig 2). This pattern was evident across two of the three campgrounds, the exception being the 3 Mile campground with slightly more male participants than female. The largest differential between the genders was at Coral Bay with 67% female and 33% male (Fig 2).

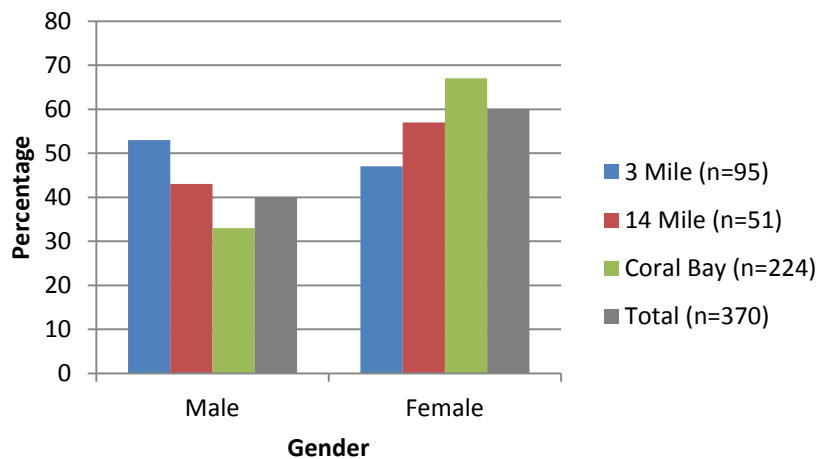


Figure 2: Gender breakdown of survey participants at three southern Ningaloo coast campgrounds.

The age of survey participants varied between campgrounds (Fig 3). For the 3 Mile campground, the percentage of participants in each age group increased up to 35-44 (31%) and then declined considerably after the 45-54 grouping. Conversely, participants at 14 Mile fell into the older age groupings with both the 45-54 and 55-64 age groups containing 27% each. No participants at 14 Mile were recorded in the 18-24 age group while Coral Bay had at least 10% of participants within each age group, with the 35-44 grouping the highest with 32%.

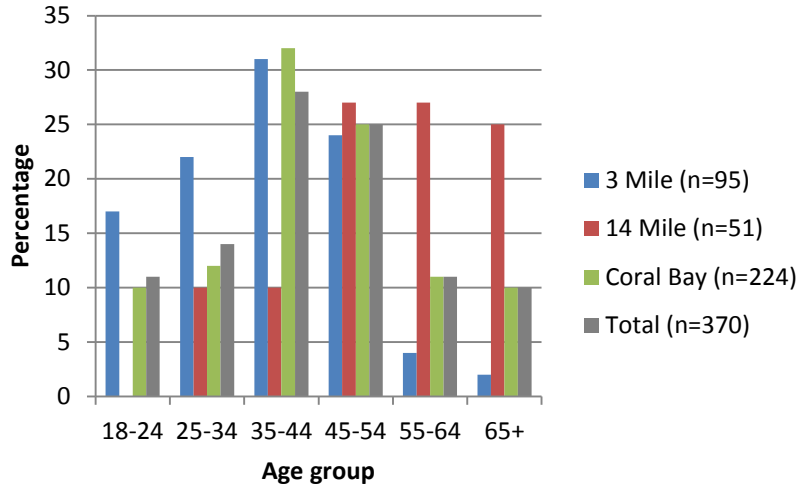


Figure 3: Age of survey participants at three southern Ningaloo coast campgrounds.

Survey participants were well educated with over 50% having a tertiary or university level of education (Table 3). Participants at 14 Mile were the only ones not to follow this trend with 34% indicating that they had a tertiary level of education. The level of education with the highest number of responses from 14 Mile visitors was secondary with 40%.

Table 3: Education level of survey participants at three southern Ningaloo coast campgrounds.

Level of education	3 Mile	14 Mile	Coral Bay	Total
Primary/some secondary	1%	0	4%	3%
Secondary	17%	40%	23%	24%
Vocational/Technical	16%	26%	17%	18%
Tertiary/University	66%	34%	55%	55%
Total	95	50	223	368

The majority of survey participants across the three campgrounds and as a total data set were Australian, with 3 Mile having the highest percentage of international visitors (6%), while no international visitors completed the survey at 14 Mile (Table 4).

Table 4: International and domestic places of residence of survey participants at three southern Ningaloo coast campgrounds.

Usual place of residence	3 Mile	14 Mile	Coral Bay	Total
Australia	94%	100%	98%	97%
International	6%	0	2%	3%
Total	91	49	215	355
Australian state of residence				
Western Australia	93%	94%	93%	93%
South Australia	0	2%	2%	2%
Victoria	6%	0	3%	3%
Tasmania	0	0	0.3%	0.2%
New South Wales	1%	2%	0.3%	0.8%
Queensland	0	2%	0.3%	0.5%
Northern Territory	0	0	0	0
Total	86	49	210	345

Over 90% of participants across the three campgrounds were Western Australian, with 14 Mile having the lowest percentage of interstate visitors (6%). For both Coral Bay and 3 Mile, the highest percentage of interstate survey participants were from Victoria, with Coral Bay the only campground with a participant from Tasmania. The two territories, Northern Territory and Australian Capital Territory, were not represented at any of the three campgrounds.

The predominant number of adults per participant group was 2 with all three campgrounds recording percentages of 50% or more, and at 78%, 14 Mile was the highest across the three campgrounds (Table 5). The larger groups (4 or more adults) were recorded at the Coral Bay and 3 Mile campgrounds.

Table 5: Number of adults per survey participant group at three southern Ningaloo coast campgrounds.

Total number of adults in participant group	3 Mile	14 Mile	Coral Bay	Total
1	2%	4%	2%	2%
2	52%	78%	50%	55%
3	7%	0	8%	6%
4	23%	16%	12%	15%
5	2%	0	3%	2%
6-10	12%	0	20%	15%
>10	1%	2%	5%	4%
Total	94	51	223	368

As for the total number of children per participant group, the highest percentage across the three campgrounds was for no children (Table 6). As per adults above, Coral Bay and 3 Mile had the higher percentage of participants with more than 4 children per group, with 10% of the participants at Coral Bay having 6-10 children per participant group. Considering this survey was distributed during the school-holiday period, this is not a surprising result.

Table 6: Total number of children per survey participant group at three southern Ningaloo coast campgrounds.

Total number of children in participant group	3 Mile	14 Mile	Coral Bay	Total
0	38%	71%	33%	40%
1	7%	8%	12%	10%
2	21%	10%	19%	18%
3	12%	6%	13%	12%
4	12%	2%	4%	6%
5	7%	4%	1%	3%
6-10	2%	0	10%	7%
>10	0	0	7%	4%
Total	94	51	223	368

Of the seven travel group categories listed in the survey instrument (App. 2), only four of these garnered responses – “by yourself”; “family”; “friends”; and “family and friends” (Fig 4). Of these, “family” had the highest percentage of participants across the three campgrounds, with “family and friends” the next highest. Interestingly, no participants from 3 Mile indicated that they were “by yourself” even though 2% of participants indicated that there was a total of 1 adult in their group (Table 5). Conversely, it should be noted that not all of the participants who ticked “by yourself” were travelling on their own. It was observed by the researcher that a number of young couples without children would tick this category rather than “family” to describe their travel group.

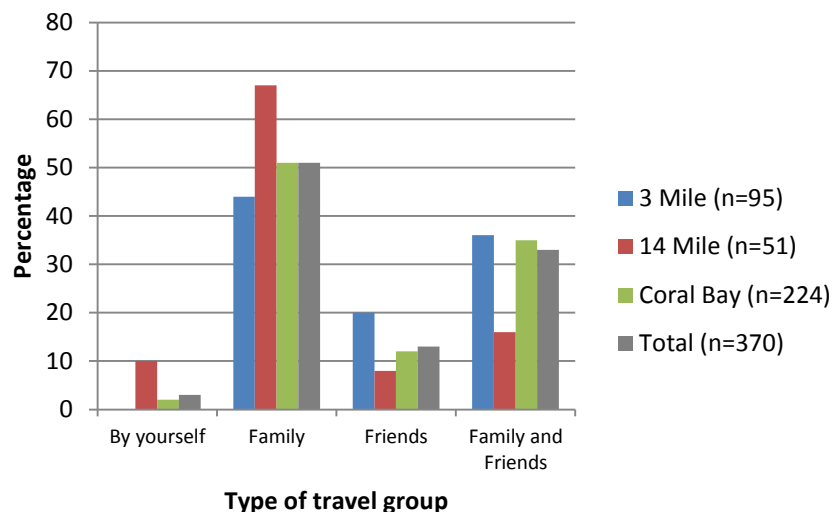


Figure 4: Type of travel group of survey participants at three southern Ningaloo coast campgrounds.

Participants were asked to indicate how often they had visited Ningaloo Reef, with the highest percentage of participants indicating that they visited once per year (28% overall) followed by first visit (26% overall) (Fig 5). Coral Bay had the highest percentage of first

time visitors with 29%, while 3 Mile was the only campground to have a participant who indicated that they visited on a weekly basis.

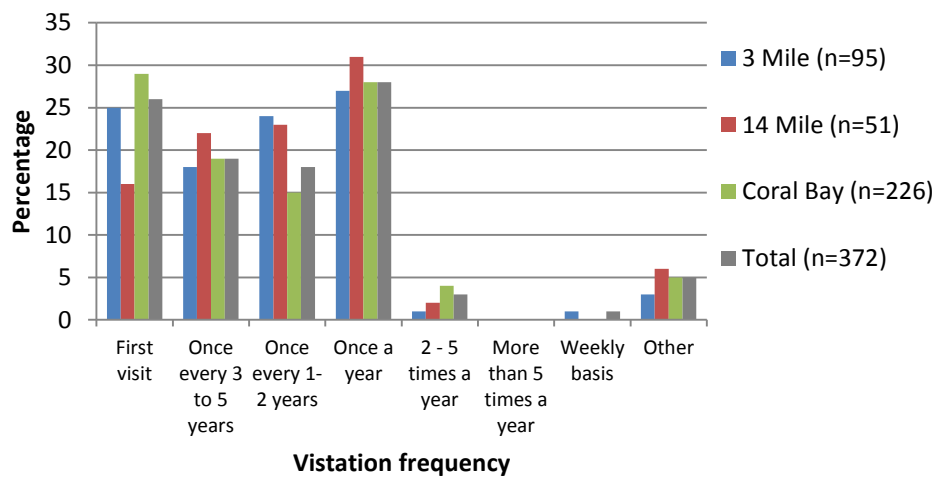


Figure 5: Frequency of visitation to Ningaloo of survey participants at three southern Ningaloo coast campgrounds.

Those participants who indicated that they had visited the Ningaloo Reef previously were asked to specify whether they always visited the same location. Coral Bay had the highest percentage of participants who indicated “always same” (57%), with 14 Mile having the highest percentage of the “sometimes” category (54%) (Fig 6). Of those that indicated “always different”, 3 Mile was the highest with 24%.

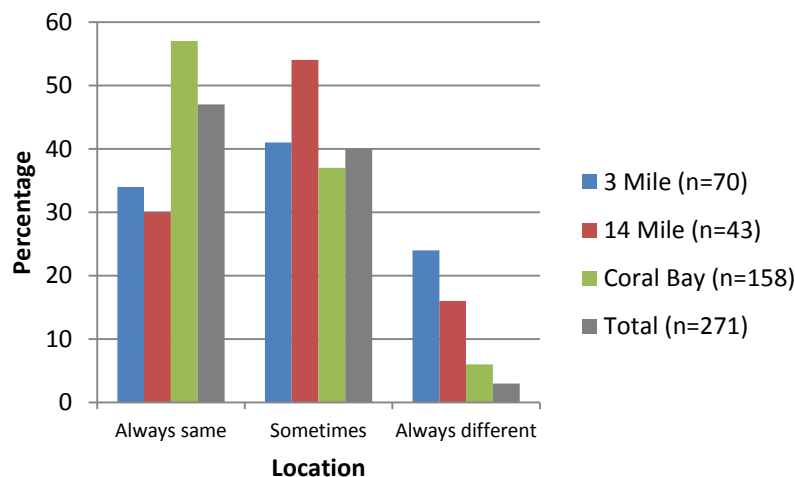


Figure 6: Indication of whether survey participants stayed at same location at three southern Ningaloo coast campgrounds.

Just over three-quarters of participants (75%) from 14 Mile indicated that their main reason for visiting the site was to “enjoy outdoor environment” (Fig 7). In comparison, just under half of the participants to the other two campgrounds also indicated that this was the main

reason. It is also not surprising that 3 Mile had the highest number of participants specifying their main reason for visiting was to “do my favourite activity” given its popularity as a surfing and windsurfing location. “Spend time with family and friends” had a higher percentage at Coral Bay, which would link to the larger group sizes identified at this campground. For those who ticked “Other”, dominant responses related to warm weather, fishing, snorkelling, relaxing, being “underdeveloped” and remoteness.

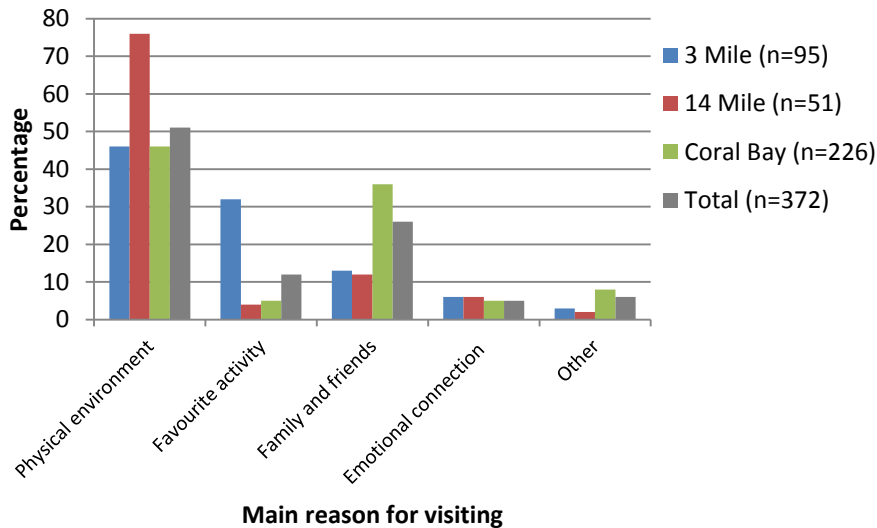


Figure 7: Main reason for staying at campgrounds for survey participants at three southern Ningaloo coast campgrounds.

Participants were asked to rate how well they knew the campground on a scale from 1 (“not at all”) to 9 (“extremely well”). The mean for the total data set was 5.24 (SD = 2.25), which is reflected in the figure below (Fig 8) with 5 having the highest percentage scores for the three campgrounds. The higher end of the scale (5-9) received higher percentages of participants than the lower end, which would imply participants feel they are more than somewhat familiar with their particular destination.

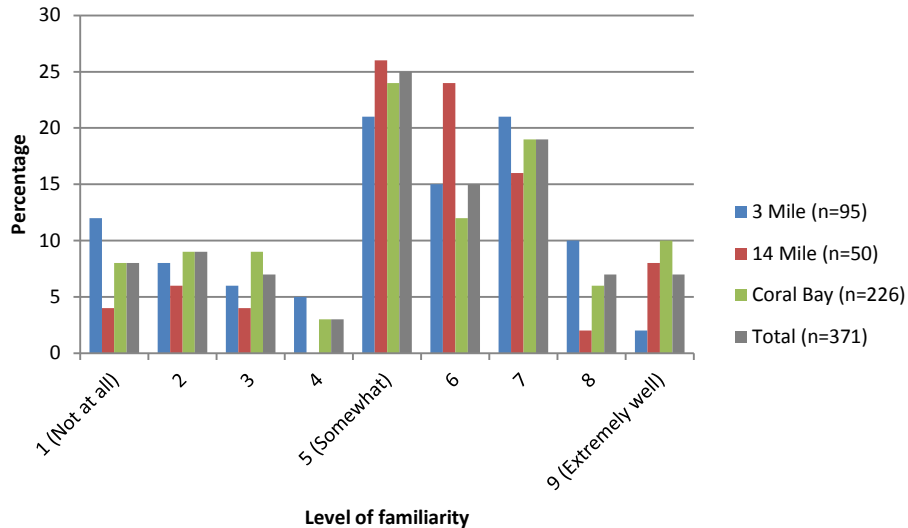


Figure 8: Level of familiarity with the particular campgrounds of survey participants at three southern Ningaloo coast campgrounds.

For the question relating to whether Ningaloo Reef was a special place, Coral Bay was the only campground to record below 90% of participants indicating “yes”, with 86% (Table 7).

Table 7: Responses of survey participants at three southern Ningaloo coast campgrounds to question of Ningaloo Reef being a special place.

Ningaloo a special place	3 Mile	14 Mile	Coral Bay	Total
Yes	93%	96%	86%	89%
No	7%	4%	14%	11%
Total	95	51	223	369

The three questions relating to the Ningaloo Coast’s nomination for World Heritage Listing were only asked at 3 Mile and Coral Bay. After discussions with the leaseholder of Warroora Station, it was decided that this question would be left out of the survey distributed to visitors at 14 Mile campground. From the results presented in the table below (Table 8), participants from 3 Mile were more aware of the recent nomination with 63%, compared to just under 50% of participants from Coral Bay. Of those that knew it was nominated, the majority indicated that this had no influence on their decision to visit. Two-thirds of participants indicated that if the Ningaloo Coast was listed as a World Heritage Site, it would have no effect on their future experiences and up to a third indicated it would have a positive effect.

Table 8: Responses of survey participants at two southern Ningaloo coast campgrounds relating to recent nomination of Ningaloo Coast for World Heritage Listing

Knew nominated	3 Mile	Coral Bay	Total
Yes	63%	49%	54%
No	37%	51%	46%
Total	95	225	320
Influenced Decision			
Yes	7%	3%	4%
No	93%	97%	96%
Total	58	112	170
Effect			
Positive	30%	27%	28%
None	65%	67%	67%
Negative	4%	6%	5%
Total	92	223	315

3.1.2 Place Attachment Statements

For the total cohort, the highest mean (3.74) was the place dependence statement “Ningaloo is the best place for what I like to do” (Table 9). The statement with the lowest mean (1.85) was the social bonding statement “If I were to stop coming here to Ningaloo I would lose contact with a number of friends”. As a whole, the social bonding statements produced considerably lower means with only two of the four statements above 2.5. All the everybody’s happy, place identity and place dependence statements had means above 2.5.

On a site by site basis, 3 Mile recorded the highest mean with 3.95 (SD=0.83) for the place dependence statement “Ningaloo is the best place for what I like to do”. This campground also produced the lowest mean of 1.78 (SD=1.03) for the social bonding statement “If I were to stop coming here to Ningaloo I would lose contact with a number of friends”. This statement also recorded the lowest mean from Coral Bay participants, however this was not the case at 14 Mile. The lowest mean for 14 Mile related to another social bonding statement “My family and friends would be disappointed if I were to start visiting other coastal places rather than Ningaloo”.

The place attachment dimension with the highest overall mean was for the more affective/emotional dimension “everybody’s happy” (3.20), followed by the more traditional place attachment dimension, place identity (3.05). The lowest overall mean was for the social bonding dimension with 2.48.

Table 9: Means and standard deviations for place attachment statements per southern Ningaloo coast campground.

Place attachment statement	3 Mile			14 Mile			Coral Bay			Total		
	N	Mean	SD.	N	Mean	SD	N	Mean	SD.	N	Mean	SD
Place identity (overall mean = 3.05)												
I feel that Ningaloo is a part of me	95	3.07	1.10	50	2.98	0.96	223	2.64	1.11	368	2.80	1.10
I am very attached to Ningaloo	94	3.28	1.05	51	3.35	1.07	216	2.77	1.19	361	2.98	1.16
I identify strongly with Ningaloo	95	3.27	0.99	51	3.22	1.05	222	2.86	1.13	368	3.02	1.10
Ningaloo is very special to me	94	3.65	1.02	51	3.53	1.27	223	3.13	1.14	368	3.32	1.15
Visiting Ningaloo says a lot about who I am	95	3.00	1.05	50	3.12	1.30	222	2.67	1.20	367	2.82	1.19
Ningaloo means a lot to me	95	3.68	1.05	51	3.63	1.11	221	3.19	1.81	367	3.38	1.16
Place dependence (overall mean = 2.92)												
Ningaloo is the best place for what I like to do	95	3.95	0.83	51	3.88	0.77	223	3.62	0.95	369	3.74	0.90
The things I do at Ningaloo I would enjoy doing just as much at a similar place	95	2.78	1.17	49	2.80	1.31	223	2.67	1.16	367	2.71	1.18
No other place can compare to Ningaloo	94	3.38	1.30	51	3.57	1.20	221	3.04	1.25	366	3.20	1.27
Doing what I do here is more important to me than doing it at any other place	95	2.88	1.15	50	3.10	1.33	222	2.49	1.10	367	2.67	1.17
I wouldn't substitute any other area for doing the type of things I do at Ningaloo	94	2.64	1.25	49	3.02	1.44	222	2.47	1.91	365	2.59	1.25
I get more satisfaction from visiting Ningaloo than any other place	95	2.60	1.14	50	3.00	1.32	223	2.50	1.19	368	2.60	1.20
Social bonding (overall mean = 2.48)												
My family and friends would be disappointed if I were to start visiting other coastal places rather than Ningaloo	95	2.07	1.26	50	1.92	1.29	223	1.92	1.11	368	1.96	1.17
A feeling of community runs between me and the other campers here at Ningaloo	95	3.40	1.20	50	3.38	1.24	222	3.30	1.04	367	3.34	1.11
If I were to stop coming here to Ningaloo, I would lose contact with a number of friends	94	1.78	1.03	51	2.12	1.34	223	1.81	1.20	368	1.85	1.18
The friendships and associations I have with other people here at Ningaloo mean a lot to me	95	2.95	1.08	50	2.80	1.37	222	2.68	1.14	367	2.77	1.16
Everybody's happy (overall mean = 3.20)												
Ningaloo is important to me because my family/group of friends enjoy it	95	3.53	1.18	51	3.35	1.20	222	3.41	1.11	368	3.43	1.14
I rely on Ningaloo to provide an enjoyable experience for my family/group of friends	95	3.14	1.17	51	3.00	1.41	223	3.04	1.27	369	3.06	1.27
There is no place like Ningaloo where member of my family/group of friends can enjoy their own experiences in the one place	95	2.74	1.18	50	3.00	1.37	223	2.70	1.28	368	2.75	1.27
Holidays to Ningaloo are important to us as a family/group of friends because everyone can enjoy themselves	95	3.63	1.21	50	3.62	1.16	221	3.53	1.15	366	3.57	1.14

3.1.3 Perceptions of Management Actions

For the total cohort, the possible management actions with the highest level of support related to providing: additional information about Ningaloo Reef; information on snorkelling with minimal impact; and clearer markings of the sanctuary zone boundaries (Table 10). The management action with lowest level of support from the total cohort was “Develop an eco-resort at Gnaraloo Bay” (mean=2.36).

As per the total cohort, the management action relating to an eco-resort at Gnaraloo Bay had the lowest level of support across the three campsites, however Coral Bay participants were not as strongly against this action in comparison to the other two sites. The largest differences in means for possible management actions were between Coral Bay and the remaining two campgrounds regarding two-wheel drive access to Warroora and Gnaraloo and providing moorings for recreational boats. Generally, there was higher support for the possible management actions at Coral Bay with no action producing a mean below 2.5. In contrast, the other two campgrounds each had three actions with a mean below 2.5.

Table 10: Means and standard deviations for possible management actions at the three southern Ningaloo coast campgrounds.

Possible Management Actions	3 Mile			14 Mile			Coral Bay			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Provide signs with information on the marine and terrestrial environment of Ningaloo Reef	95	4.08	0.87	50	3.80	1.23	225	4.02	0.95	370	4.01	0.97
Provide signs and information to educate visitors about how to snorkel with minimal impact	95	4.15	1.01	51	4.16	1.17	225	4.17	0.89	371	4.16	0.96
Provide clearer markers for the sanctuary zone boundaries	94	3.79	1.05	50	4.14	1.19	224	4.02	0.97	368	3.98	1.03
Create designated zones for motorised recreation water craft such as jetskis	95	3.07	1.53	51	2.71	1.71	225	2.99	1.59	371	2.97	1.59
Create designated zones for non-motorised recreational activities such as windsurfing and kitesurfing	94	3.02	1.35	51	3.31	1.45	224	3.38	1.27	369	3.28	1.32
Create designated zones for no interaction between humans and manta rays	93	3.28	1.27	51	3.27	1.37	222	3.41	1.25	366	3.36	1.27
Provide 2WD access to Warroora and/or Gnaraloo	95	1.96	1.29	51	1.88	1.27	221	2.81	1.43	367	2.46	1.43
Provide moorings for recreational boats over 5m at specific sites	95	2.20	1.40	51	2.12	1.40	223	2.90	1.31	369	2.61	1.39
Access to certain turtle-nesting beaches during the breeding season is by guided tour only	95	3.62	1.39	51	3.61	1.60	223	3.79	1.31	369	3.72	1.37
Increase the frequency of visits by rangers to sites along Ningaloo Reef	95	3.22	1.32	51	2.96	1.47	223	3.64	1.17	369	3.44	1.23
Appoint honorary rangers to help with education	95	3.48	0.99	51	3.29	1.51	223	3.66	1.12	369	3.57	1.16
Develop an eco-resort at Gnaraloo Bay	95	1.75	1.18	51	1.86	1.28	222	2.74	1.34	368	2.36	1.37
Develop sea-kayaking trails along Ningaloo Reef	95	2.82	1.21	51	2.73	1.31	222	3.54	1.14	368	3.24	1.24

3.1.4 Pro-environmental Behaviours

The highest mean for onsite behaviours (Table 11) was 5.00 for consciously conserving water by participants to 14 Mile. This is not surprising given visitors to 14 Mile have to provide all of their potable drinking water and the distances required to travel to obtain additional water. Also high (mean=4.96) was “Restrict my vehicle movements to designated access tracks”. 14 Mile also provided the only mean under 4.0 for this category of behaviours, with 3.69 recorded in relation to “Not feeding wildlife (including fish)”.

When participants were asked to indicate if they would tell others to undertake the same six behaviours, the means were not as high as those for the on-site behaviours undertaken by the participants themselves. However, all responses except for one (“Learn more about Ningaloo Reef’s natural environment”, Coral Bay) were above 3.5. Participants at 14 Mile were more likely to tell others to recycle (4.14), while for 3 Mile and Coral Bay, participants were more likely to tell others to pick up litter (4.14; 3.81). This also had the highest mean when the three campgrounds were combined as a total cohort (3.92).

Off-site conservation intentions recorded the lowest means across the three behaviour categories. The overall data set and the three campgrounds all had their highest means for the behavioural intention relating to the signing of petitions (means ranging from 3.57 to 3.89) and their lowest means for participating in public meetings (means ranging from 2.29 to 2.62).

Table 11: Means and standard deviations for the three survey questions relating to pro-environmental behavioural intentions at three southern Ningaloo coast campgrounds.

Behavioural Intentions	3 Mile			14 Mile			Coral Bay			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Do yourself												
Pick up litter	95	4.65	0.62	51	4.65	0.93	224	4.46	0.85	370	4.54	0.81
Not feed wildlife (including fish)	95	4.35	1.22	51	3.69	1.59	223	4.24	1.10	369	4.19	1.22
Learn more about Ningaloo Reef's natural environment	94	4.04	0.76	50	4.18	0.75	223	4.03	0.76	367	4.05	0.76
Consciously conserve water in my daily activities	95	4.78	0.53	51	5.00	0.00	224	4.49	0.75	370	4.63	0.67
Restrict my vehicle movements to designated access tracks	95	4.69	0.80	51	4.96	0.20	224	4.57	0.86	370	4.66	0.79
Place my cans and glass bottles in campsite recycling bins (if provided)	95	4.85	0.46	51	4.69	0.51	222	4.58	0.62	368	4.67	0.58
Tell others												
Pick up litter	94	4.14	1.05	50	3.98	1.38	223	3.81	1.20	367	3.92	1.20
Not feed wildlife (including fish)	94	3.94	1.00	49	3.84	1.39	222	3.74	1.15	365	3.80	1.15
Learn more about Ningaloo Reef's natural environment	94	3.70	1.00	49	3.73	1.20	223	3.48	1.11	366	3.57	1.10
Consciously conserve water in their daily activities	94	3.99	1.04	50	4.04	1.40	223	3.65	1.15	367	3.79	1.17
Restrict their vehicle movements to designated access tracks	94	3.90	1.12	50	3.98	1.36	223	3.61	1.20	367	3.73	1.21
Place their cans and glass bottles in campsite recycling bins (if provided)	94	4.05	1.05	51	4.14	1.22	222	3.73	1.16	367	3.87	1.15
Conservation actions												
Work as a volunteer on conservation projects in this area	94	2.89	1.27	49	2.88	1.20	224	2.66	1.25	367	2.75	1.25
Participate in public meetings about managing Ningaloo Reef	95	2.62	1.25	49	2.67	1.18	224	2.29	1.18	368	2.42	1.21
Sign petitions in support of the conservation of Ningaloo Reef	95	3.89	0.99	50	3.78	1.10	223	3.57	1.00	368	3.68	1.01
Circulate petitions in support of the conservation of Ningaloo Reef	95	3.20	1.18	50	3.00	1.26	224	2.61	1.17	369	2.81	1.21
Write letters in support of the conservation of Ningaloo Reef	94	3.11	1.20	49	2.84	1.33	224	2.67	1.24	367	2.80	1.25
Donate money to conservation projects to help protect Ningaloo Reef	95	3.37	1.03	50	2.64	1.22	224	2.79	1.14	369	2.92	1.15

3.2 Comparison of campgrounds

The summary table below (Table 12) provides a comparison of the three campgrounds according to visit and visitor characteristics and responses to the place statements, management actions and behavioural intentions. There are a number of similarities between campgrounds, particularly for the visit characteristics including the number of adults and children per group, type of group, main reason for visiting and level of familiarity. Coral Bay and 3 Mile were similar in their visitor characteristics, having similar percentages for age group, level of education and usual place of residence.

For place attachment, place identity was the dimension with the highest mean at 3 Mile and 14 Mile (3.33 and 3.31 respectively), while for Coral Bay it was everybody's happy (3.17). The dimension with the lowest mean was the same for all three campgrounds, social bonding. Responses to the place statements themselves were similar with the statement with the highest mean being the same across the campgrounds, this was "Ningaloo is the best place for what I like to do". Coral Bay and 3 Mile both had the same statement for the lowest mean, "If I were to stop coming here to Ningaloo I would lose contact with a number of friends". Additionally Coral Bay and 3 Mile have the same variables with the highest and lowest means for the management actions and behavioural intentions (Table 12).

Table 12: Comparison of survey results across the three southern Ningaloo coast campgrounds

Variable	3 Mile	14 Mile	Coral Bay
Visitor Characteristic			
Gender	Female (47%)	Female (57%)	Female (67%)
Age group	35-44 (31%)	35-44 (10%)	35-44 (32%)
Education	Tertiary/University (66%)	Tertiary/University (34%)	Tertiary/University (55%)
Usual place of residence	Western Australia (93%)	Western Australia (94%)	Western Australia (93%)
Visit Characteristic			
Number of adults per group	2 (52%)	2 (78%)	2 (50%)
Number of children per group	0 (38%)	0 (71%)	0 (33%)
Type of travel group	Family (44%)	Family (67%)	Family (51%)
Visitation frequency	Once a year (27%)	Once a year (31%)	Once a year (28%)
Same location	Sometimes (41%)	Sometimes (54%)	Sometimes (37%)
Main reason for visiting	Physical environment (46%)	Physical environment (76%)	Physical environment (46%)
Level of familiarity	5 (somewhat) (21%)	5 (somewhat) (36%)	5 (somewhat) (24%)
Place attachment statements and dimensions			
Statement with highest mean	Ningaloo is the best place for what I like to do (3.95)	Ningaloo is the best place for what I like to do (3.88)	Ningaloo is the best place for what I like to do (3.62)
Statement with lowest mean	If I were to stop coming here to Ningaloo I would lose contact with a number of friends (1.78)	My family and friends would be disappointed if I were start visiting other coastal places rather than Ningaloo (1.92)	If I were to stop coming here to Ningaloo I would lose contact with a number of friends (1.81)
Dimension with highest mean	Place identity (3.33)	Place identity (3.31)	Everybody's happy (3.17)
Dimension with lowest mean	Social bonding (2.55)	Social bonding (2.55)	Social bonding (2.43)
Management Action			
Management action with highest mean	Provide signs and information to educate visitors about how to snorkel with minimal impact (4.15)	Provide signs and information to educate visitors about how to snorkel with minimal impact (4.16)	Provide signs and information to educate visitors about how to snorkel with minimal impact (4.17)
Management action with lowest mean	Develop an eco-resort at Gnaraloo Bay (1.75)	Provide 2WD access to Warroora and/or Gnaraloo (1.88)	Develop an eco-resort at Gnaraloo Bay (2.74)
Behavioural Intentions			
Do yourself onsite with highest mean	Place my cans and glass bottles in campsite recycling bins (if provided) (4.85)	Consciously conserve water in my daily activities (5.00)	Place my cans and glass bottles in campsite recycling bins (if provided) (4.58)

Variable	3 Mile	14 Mile	Coral Bay
Do yourself onsite with lowest mean	Learn more about Ningaloo Reef's natural environment (4.04)	Not feeding wildlife (including fish) (3.69)	Learn more about Ningaloo Reef's natural environment (4.03)
Tell others on-site with highest mean	Pick up litter (4.14)	Place my cans and glass bottles in campsite recycling bins (if provided) (4.14)	Pick up litter (3.81)
Tell others onsite with lowest mean	Learn more about Ningaloo Reef's natural environment (3.70)	Learn more about Ningaloo Reef's natural environment (3.73)	Learn more about Ningaloo Reef's natural environment (3.48)
Conservation offsite action with highest mean	Sign petitions in support of the conservation of Ningaloo Reef (3.89)	Sign petitions in support of the conservation of Ningaloo Reef (3.78)	Sign petitions in support of the conservation of Ningaloo Reef (3.57)
Conservation offsite action with lowest mean	Participate in public meetings about managing Ningaloo Reef (2.62)	Donate money to conservation projects to help protected Ningaloo Reef (2.64)	Participate in public meetings about managing Ningaloo Reef (2.29)

4 Management Implications and Recommendations

The following section contains implications and recommendations for management of Ningaloo Marine Park and adjacent campgrounds, based on the results presented above. In reading these recommendations it should be acknowledged that DEC has responsibility for use and access to the Ningaloo Marine Park.

4.1 Use an enhanced understanding of the effects of place attachment on visitors' perceptions and expectations in the implementation of any management changes to these campgrounds and to the use of and access to the Marine Park.

Place identity and the affective dimension, everybody's happy, had the highest means among the place attachment dimensions. This indicates that the bond visitors form with Ningaloo is based on emotive, affective and symbolic values as well as activities and access to and use of resources. Initially, this result may not seem to provide tangible advice for managers and planners to use. However, this result importantly provides understanding and a crucial context for management decisions.

a) Place identity

Rather than solely examining the effects of decisions on resources and activities, greater support (or opposition) is likely to occur when decisions affect how visitors perceive themselves, both on the Ningaloo coast, when they travel elsewhere and return home. For example, new facilities or rules that may negatively change how individuals express, construct and reconstruct their self-identity through activities and social interactions at Ningaloo are unlikely to be supported. To take an example from this study, providing 2-wheel drive access to the pastoral stations is highly likely to be met with opposition from current visitors to the pastoral campgrounds.

The self-identity of these visitors is built around being able to negotiate difficult roads and tracks, and having the skills, transport and equipment that makes such travel possible. These abilities contribute to these visitors' sense of who they are, both when camping and when they return to daily life away from Ningaloo. Changing access provisions thus has more wide-reaching effects for these individuals beyond the physical changes to the Ningaloo hinterland (through road upgrades for example) in which they are recreating.

b) Place dependence

Place dependent visitors place importance on being able to undertake certain activities at a particular place. Visitors often stay at a site due to access to particular activities or experiences. To use examples from this study, some visitors to 3 Mile stay there due to access to the nearby surfbreak, visitors to 14 Mile enjoy the isolation and ability to camp right next to the beach for extended periods. However for visitors to Coral Bay, it is access to safe beaches, closeness of Ningaloo Reef and provision of facilities and amenities popular with families. Any change to current zoning or access to sites where particular activities occur (e.g. surfing, fishing, etc) must be carefully considered as to the impacts on these place dependent visitors. Clearly communicating changes in zoning or access, including a rationale as to the reason why and an indication of where particular activities could occur in the future are best used to reach these activity-orientated visitors.

c) Everybody's happy

A key facet of this affective dimension centred on the ability to undertake a number of activities in the one convenient location. During the qualitative phase of this research this new affective dimension was identified and discussion centred around multiple activities being available within walking distance of the campground. Being able to camp on the coast is central to this dimension of place attachment as it means that many of the favoured marine-based activities are within walking distance for all members of the family or friendship group.

4.2 Provide additional visitor information on how to further protect the natural environment when undertaking marine-based recreation.

The three most supported management actions related to: (1) the provision of additional information on the natural terrestrial and marine environment; (2) snorkelling in an environmentally responsible manner; and (3) clearer markings for the sanctuary zone boundaries. A number of simple communication measures could be implemented that could further protect the natural environment of the Ningaloo coast.

In relation to snorkelling, pamphlets, signs or mobile phone “apps” could be developed explaining how to act in a responsible manner when snorkelling. This could address issues regarding where to stand while in the water and how to avoid kicking coral. It could also include information on what visitors may see when they snorkel and contain pictures and information of common fish species and the different types of coral. An added advantage

would publishing these communication tools in a range of languages to cater for international tourists who may not have snorkelled previously, especially at Coral Bay.

4.3 If additional infrastructure is provided, keep it to a minimum.

From the survey results above, the management actions relating to the provision of additional facilities and infrastructure received the least amount of support (e.g. development of an eco-resort at Gnaraloo Bay). This suggests that the provision of any additional infrastructure or facilities should be kept to a minimum (bar the provision of additional information as outlined above). Visitors to Ningaloo seem to be happy with the current facilities and did not support actions that would see an increase in additional facilities such as moorings, eco-resorts and kayaking trails. Additionally, many participants, particularly those from 3 Mile and 14 Mile campgrounds, were not supportive of making these campgrounds accessible to two-wheel drive vehicles. These types of facilities would also change the type of experience that would be available at settings, also potentially impacting current visitors' attachment to Ningaloo.

The three campsites chosen as study areas for this study represent three differing types of settings within the Recreational Opportunity Spectrum (Table 13) (Manning, 2011). The campsites at 14 Mile can be equated with primitive or semi-primitive settings, 3 Mile would be a rustic setting and Coral Bay a concentrated setting (Table 13). Further, Exmouth could be classed as a modern urbanised setting. It is important that a range of settings with differing recreational and managerial conditions is provided in order to meet demands of a variety of visitors. As managers will never be able to fully predict the demand of visitors in relation to setting conditions, the best approach to facility provision is to provide a diversity of settings so that as wide a range of visitor needs as possible can be met (Newsome, et al., 2002). As such, the provision of any additional facilities at each of these locations should be carefully considered to maintain this diversity in recreational opportunities.

Table 13: Recreation opportunity spectrum from Brown et al. (1978) as presented in Manning (2011)

Opportunity class	Description
Primitive	Exclusive opportunity for isolation; managed to be essentially free from evidence of man-induced restrictions and controls; no facilities for visitor comfort or convenience are provided
Semi-primitive	Some opportunities for isolation; minimal on-site controls and restrictions; facilities provided to ensure protection of natural environment and visitor safety; on-site materials used where possible
Rustic	Equal opportunities for affiliation with others and opportunities for isolation; on-site controls and facilities present but subtle; rustic facilities provided for convenience of visitor as well as resource protection
Concentrated	Opportunities to experience affiliation with individuals and groups; clear evidence of controls and restrictions; considerable number of facilities present designed for use by large numbers of people
Modern urbanised	Characterised by substantially urbanised environment; large number of visitors present; clear evidence of controls and restrictions; considerable number of facilities present

4.4 Acknowledge and build on the environmentally responsible behavioural intentions of visitors.

The pro-environmental behaviours listed under the ‘do yourself’ category received the highest level of support, with all behaviours (bar one) in this category recording means above 4.0 across the three campgrounds and as a whole cohort. This indicates that most visitors generally act or intend to act in an environmentally responsible manner while camping and recreating along the Ningaloo coast. The implications from this finding could include maintaining the status quo when it came to providing information or facilities necessary for the continuation of these behaviours, or additionally, providing extra facilities (e.g. recycling points) to ensure these types of behaviour continue.

Also, participants indicated that they would consider telling others to perform these behaviours to some degree. This could prove to be an interesting opportunity for managers in finding ways to encourage the functioning of social norms and obligations as a way of promoting environmentally responsible behaviour. Through appealing to an individual’s sense of identity, especially the notion that by caring for Ningaloo they are caring for themselves, pro-environmental behaviours of visitors both on- and off-site may be further facilitated. For example, one of the staff members at the Gnaraloo Station has now been made an honorary ranger and there may be opportunities for other staff members at the pastoral stations or Coral Bay to continue with this program if proven successful at Gnaraloo Station. Additionally, visitors who have visited over multiple years could be used a source of

information and could be provided with maps or pamphlets to hand out on-site to new or first time visitors.

4.5 Clearly communicate the World Heritage status of the Ningaloo coast, including Ningaloo Marine Park.

Only half of the participants in this study were aware of the listing of the Ningaloo coast. As such, there seems great value in making this change in status more evident, as listing can result in further support for such areas. Also, while the majority of participants indicated that the World Heritage listing is likely to have no or a positive effect on their experiences, it would seem prudent to clearly communicate the implications of the listing on visitors' future experiences. Anecdotal observations during the distribution of the survey indicated that a number of visitors were unaware of the actual impacts (both positive and negative) the listing would have and therefore its effect on their future experiences. Keeping visitors informed and up-to-date of any changes in management regimes can optimise the likelihood of ongoing public support for such management.

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Appendix 1

Tonge, J. (2012) *Understanding the place attachment of campers along the southern Ningaloo coast, Australia*. (PhD Thesis) School of Environmental Science, Murdoch University, Western Australia

Tonge, J., Moore, S.A., Beckley, L.E. and Ryan, M “Using photo-elicitation to explore the place meanings of campers along the Ningaloo Coast, north-western Australia” – submitted to *Australian Geographer*

Tonge, J., Ryan, M., Moore, S.A., and Beckley, L.E. “The effect of place attachment on pro-environment behavioral intentions of visitors to Ningaloo Marine Park” – under revision

Tonge, J., Moore, S.A., Valesini, F., Beckley, L.E. and Ryan, M “Place attachment and management preferences of visitors to a coastal World Heritage site, Australia” – submitted to *Visitor Studies*

Tonge, J., Moore, S.A., Beckley, L.E. and Ryan, M “Place attachment of visitors to natural areas: A review and future research directions” – under revision.

Appendix 2

Visitor Survey We value your feedback

Dear Visitor,

This survey asks for your views on camping and holidaying at Ningaloo Reef.

Once completed, please return to the Murdoch University researcher.

Thank you for sharing your thoughts and ideas



This study has been approved by the Murdoch University Human Research Ethics Committee (Approval 2009/119). If you have any reservation or complaint about the ethical conduct of this research, and wish to talk with an independent person, you may contact Murdoch University's Research Ethics Office (Tel. 08 9360 6677 (for overseas studies, +61 8 9360 6677) or e- mail ethics@murdoch.edu.au). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Q1. How often do you visit Ningaloo Reef?

[✓] one box only.

- | | |
|--|--|
| <input type="checkbox"/> First visit (<i>Go to question 3</i>) | <input type="checkbox"/> On a weekly basis |
| <input type="checkbox"/> More than 5 times a year | <input type="checkbox"/> 2 to 5 times a year |
| <input type="checkbox"/> Once a year | <input type="checkbox"/> Once every 1 to 2 years |
| <input type="checkbox"/> Once every 3 to 5 years | <input type="checkbox"/> Other: _____ |

Q2. Do you always stay at the same location?

[✓] one box only.

- | | | |
|--------------------------------------|------------------------------------|---|
| <input type="checkbox"/> Always same | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Always different |
|--------------------------------------|------------------------------------|---|

Q3. What is your main reason for staying at this place

[✓] one box only.

- | | | |
|--|---|--|
| <input type="checkbox"/> Enjoy outdoor environment | <input type="checkbox"/> Do my favourite activity | <input type="checkbox"/> Spend time with family and/or friends |
| <input type="checkbox"/> Feel a connection to this place | <input type="checkbox"/> Other: (please add) | _____ |

Q4. Are there any other reasons for staying at this place?

[✓] more than one box.

- | | | |
|--|---|--|
| <input type="checkbox"/> Enjoy outdoor environment | <input type="checkbox"/> Do my favourite activity | <input type="checkbox"/> Spend time with family and/or friends |
| <input type="checkbox"/> Feel a connection to this place | <input type="checkbox"/> Other: (please add) | _____ |

Q5. How well do you know this place?

please circle one number only

- | | | | | | | | | |
|------------|---|---|---|----------|---|---|---|----------------|
| Not at all | | | | Somewhat | | | | Extremely well |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Q6. Is Ningaloo Reef a special place for you?

[✓] one box only

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
|------------------------------|-----------------------------|

Q7. Please indicate your level of agreement with the following statements regarding your time here along Ningaloo Reef.
Please answer all questions by circling the number.

	Strongly disagree				Strongly agree
Ningaloo is the best place for what I like to do	1	2	3	4	5
I feel that Ningaloo is a part of me	1	2	3	4	5
My family and friends would be disappointed if I were to start visiting other coastal places rather than Ningaloo	1	2	3	4	5
I am very attached to Ningaloo	1	2	3	4	5
The things I do at Ningaloo I would enjoy doing just as much at a similar place	1	2	3	4	5
A feeling of community runs between me and the other campers here at Ningaloo	1	2	3	4	5
No other place can compare to Ningaloo	1	2	3	4	5
Ningaloo is important to me because my family / group of friends enjoy it	1	2	3	4	5
I identify strongly with Ningaloo	1	2	3	4	5
Doing what I do here at Ningaloo is more important to me than doing it at any other place	1	2	3	4	5
If I were to stop coming here to Ningaloo, I would lose contact with a number of friends	1	2	3	4	5
Ningaloo is very special to me	1	2	3	4	5
I wouldn't substitute any other area for doing the type of things I do at Ningaloo	1	2	3	4	5
The friendships and associations I have with other people here at Ningaloo mean a lot to me	1	2	3	4	5
I get more satisfaction from visiting Ningaloo than any other place	1	2	3	4	5
There is no place like Ningaloo where members of my family / group of friends can enjoy their own experiences in the one place	1	2	3	4	5
Visiting Ningaloo says a lot about who I am	1	2	3	4	5
I rely on Ningaloo to provide an enjoyable experience for my family /group of friends	1	2	3	4	5
Ningaloo means a lot to me	1	2	3	4	5
Holidays to Ningaloo are important to us as a family / groups of friends because everyone can enjoy themselves	1	2	3	4	5

Q8. Please indicate your level of agreement with the following possible management actions at Ningaloo Reef.
Please answer all questions by circling the number.

	Strongly disagree				Strongly agree
Provide signs with information on the marine and terrestrial environment of Ningaloo Reef	1	2	3	4	5
Provide signs and information to educate visitors about how to snorkel with minimum impact	1	2	3	4	5
Provide clearer markers for the sanctuary zone boundaries	1	2	3	4	5
Create designated zones for motorised recreational water craft such as jetskis	1	2	3	4	5
Create designated zones for non-motorised recreational activities such as windsurfing and kitesurfing	1	2	3	4	5
Create designated zones for no interaction between whale sharks and humans	1	2	3	4	5
Provide 2WD access to Warroora and/or Gnaraloo	1	2	3	4	5
Provide moorings for recreational boats over 5m at specific sites	1	2	3	4	5
Access to certain turtle-nesting beaches during the breeding season is by guided tour only	1	2	3	4	5
Increase the frequency of visits by rangers to sites along the Ningaloo Reef	1	2	3	4	5
Appoint honorary rangers to help with education	1	2	3	4	5
Develop an eco-resort at Gnaraloo Bay (max 100 people)	1	2	3	4	5
Develop sea-kayaking trails along the Ningaloo Reef	1	2	3	4	5

Q9. During this trip, or on previous trips here, would you be prepared to do any of the following?
Please answer all questions by circling the number.

	Wouldn't consider it			Would consider it	Already do
Pick up litter	1	2	3	4	5
Not feed wildlife (including fish)	1	2	3	4	5
Learn more about Ningaloo Reef's natural environment	1	2	3	4	5
Consciously conserve water in my daily activities	1	2	3	4	5
Restrict my vehicle movements to designated access tracks	1	2	3	4	5
Place my cans and glass bottles in campsite recycling bins (if provided)	1	2	3	4	5

Q.10 Would you tell others to do the following?
Please answer all questions by circling the number.

Pick up litter	1	2	3	4	5
Not feed wildlife (including fish)	1	2	3	4	5
Learn more about the Ningaloo Reef's natural environment	1	2	3	4	5
Consciously conserve water in daily activities	1	2	3	4	5
Restrict their vehicle movements to designated access tracks	1	2	3	4	5
Place their cans and glass bottles in campsite recycling bins (if provided)	1	2	3	4	5

Q11. Would you consider undertaking the following actions to help protect Ningaloo Reef?
Please answer all questions by circling the number.

	Wouldn't consider it			Would consider it	Already do
Work as a volunteer on conservation projects in this area	1	2	3	4	5
Participate in public meetings about managing Ningaloo Reef	1	2	3	4	5
Sign petitions in support of the conservation of Ningaloo Reef	1	2	3	4	5
Circulate petitions in support of the conservation of Ningaloo Reef	1	2	3	4	5
Write letters in support of the conservation of Ningaloo Reef	1	2	3	4	5
Donate money to conservation projects to help protect Ningaloo Reef	1	2	3	4	5

Q12. Did you know that in January 2010 the Ningaloo Coast was nominated for World Heritage Listing?
[✓] one box only

Yes No
If Yes, please go to Q13 If No, please go to Q14

Q13. Did this influence your decision to visit this time?
[✓] one box only

Yes No

Q14. If the Ningaloo Coast does become a listed as a World Heritage Site, what effect might this have on your future visits?
[✓] one box only

Positive None Negative

Q15. Your gender?
[✓] one box only

- Male Female

Q16. Which age group do you belong to?
[✓] one box only

- 18-24 25-34 35-44 45-54 55-64 65 or older

Q 17. What is the highest level of education you have completed?
[✓] one box only

- Primary/some secondary Secondary Vocational/Technical
 Tertiary/University

Q18. How many people in your group (including yourself)?
[✓] one box only

Adults _____ Children (under 18 y/o) _____

Q19. Which best describes your travel group?
[✓] one box only

- By yourself Family and friends Friends Family Tour group Business associates School/university group

Q20. Where is your usual place of residence?

- Australian Postcode _____ Overseas (Please state which country) _____

THANK YOU FOR YOUR INPUT

<i>Office Use only:</i>	Date: _____
Site: _____	Survey number: _____
Campsite number: _____	Group number: _____