Effect of interventions on the visitor experience at Karijini National Park

Report prepared for the Western Australian Department of Environment and Conservation

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Executive summary

This report outlines the results of a visitor survey distributed at Dales Gorge in Karijini National Park in Western Australia. The survey aimed to assess the effect of two interventions on visitors' experiences while also collecting valuable information about the visitor and their visit. The two interventions pertained to staff (rangers) and information for visitors and involved:

- The presence of a friendly, helpful ranger in Dales Gorge; and
- A4 double-sided information sheet on the natural features of Dales Gorge available from boxes attached to visitor information boards at Dales Gorge.

These two interventions were analysed for their effects on visitors' level of importance assigned to and satisfaction with attributes of Dales Gorge, overall view of visit and loyalty behaviours. Four treatments were conducted over 16 days in July 2012, with each assigned four days each. These were: 1) No intervention; 2) ranger present; 3) information available; 4) both ranger present and information available. Questions in the survey also covered age, place of residence, number of adults and children per group, visitation frequency, length of stay, how they heard about the Park, and whether they had encountered a ranger.

A total of 1482 visitors were approached with 1399 agreeing to participate, resulting in a response rate of 94%. The largest percentage of visitors was in the 55-64 age range (19%) with 83% indicating they were from Australia, and from analysis of postcodes 59% were from Western Australia. Most visitors (78%) indicated this was their first visit and were more likely to be staying overnight rather than visiting as part of a day-trip. Word of mouth was the most common way visitors heard of Karijini National Park (68%), with most groups containing two adults and two children.

"Able to enjoy nature" was the attribute with the highest mean level of importance and satisfaction (mean = 6.40, 6.46 respectively on a scale of 1-7). Visitors also indicated a strong level of agreement with the three questions pertaining to overall view of visit as each produced a mean over 6 on the 7-point scale. For the loyalty behaviours, visitors were most likely to "Visit another national park in Australia" (mean = 6.68).

In the analysis of the effect of the interventions, the presence of a helpful, friendly ranger had the most effect on visitor experiences. On the days when this intervention occurred, the means for the two attributes relating to rangers increased, both for perceived importance and satisfaction. However there was no effect on overall views of visit, or on willingness to undertake loyalty behaviours. The information sheet intervention was found to only increase satisfaction with one of the nine, listed attributes and had a negative effect on two of the three questions pertaining to overall view of visit.

The implications of these results relate to the presence of rangers having a positive effect on levels of importance and satisfaction with individual attributes, but not on overall view of their visit. This may be due to an already high level of satisfaction with their visit. The

information sheet intervention had mixed results and therefore in the form taken in this current study, it may have more of a negative than a positive impact on the visitor experience.

ACKNOWLEDGEMENTS

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1. Introduction

1.1 Overview

The survey described in this report forms part of a larger Australia-wide research project which looked at promoting and managing Australian national parks into the 21st century. This wider research project aims to increase the importance given to national parks and their management by Australian society by obtaining a better understanding of the market position of parks and exploring how to provide rewarding visitor experiences and enhancing loyalty. The wider research project has two main aims, including investigating and enhancing:

1. Visitor loyalty to national parks; and
2. Market position occupied by park agencies.

The survey results discussed here form a key part of the visitor loyalty aim.

1.2 Visitor experience

Generally, national parks and other protected areas are established to protect important natural or recreational resources from degradation and for broader society to appreciate and enjoy (Newsome et al., 2013). As a result, the fundamental management objective for these areas is to offer high quality experiences that satisfy the needs of visitors, while also protecting and maintaining natural resources. Managers want to provide high quality experiences and visitors want to have these types of experiences (Manning, 2011). To do this, managers of national parks and protected areas need information on visitors, who they are, what they are doing and how they perceive their visit (Hornback & Eagles, 1999; Newsome et al., 2013).

Currently, many park agencies across the world are required to become more financially self-sufficient as a result of reduced budgets or greater budgetary constraints (Eagles, 2001; Kaczynski & Crompton, 2004). This has seen a shift in the consideration of visitor management towards a business context, from simply limiting numbers and activities to the consideration of public involvement in park goal-setting, and greater emphasis on maintaining visitor satisfaction and competent financial management (Eagles, 2001). Visitors are beginning to be viewed as clients with their needs and wants given greater priority. This is because in the new budget-constrained world, financial contributions from visitors can potentially increase the capacity of park managers to not only provide a service to the public, but also protect the environment through increased revenue from park and activity fees and tourism licence concessions (Eagles, 2001; Buckley, 2009).

While previously monitored in terms of visitor satisfaction, other concepts are being used to measure and evaluate the happiness of the client (visitor). Visitor loyalty is one of these concepts. It focuses on the commitment of the individual to a park or destination and is often measured by intention to revisit the park or recommend it to others (del Bosque & San Martin, 2008). Through producing loyal visitors, park managers can establish and better

defend a market position in the competition for limited resources and money (Eagles, 2001). Visitor satisfaction is still commonly used as a measure by park agencies and researchers, both in assessment of satisfaction with individual features or attributes and satisfaction with overall visitor experience. Satisfaction with individual attributes is often measured simultaneously with the visitors' perceived level of importance of that attribute to their visit. This is generally conducted in order to perform associated importance-performance analysis to provide an indication to managers of where to prioritise action, if needed.

1.3 Purpose of study

The survey of visitors to Karijini National Park reported here aims to provide information in order to measure whether the needs of the client (visitor) are being met, and more importantly if this can be affected through factors within managers' control. By using an experimental-based design (e.g. having a control and a manipulation) this part of the larger research project was designed to examine the effect of manipulating two attributes pertaining to facilities and service quality, to determine if there was any effect on visitors' satisfaction (both with individual attributes and pertaining to overall experience) and loyalty. The two attributes to be manipulated via interventions were:

1. Staff (i.e. rangers); and
2. Visitor information

Both of these have been identified in previous research as facilities and services important to visitors during their visit (Ryan & Cessford, 2003; Wade & Eagles, 2003; Tonge & Moore, 2007).

1.4 Study site – Karijini National Park

At 627, 455ha in size, Karijini National Park is the second largest national park in Western Australia. If features a number of spectacular geological formations from deep gorges to high plateaus. Popular recreational activities include hiking and nature study. Currently, the campground near Dales Gorge is the only publicly available accommodation within the park, with the Karijini Eco Retreat providing commercial tent-based accommodation and some campsites.

The park was chosen for this project as it has high percentages of two of the four visitor market segments using Western Australian parks identified recently as part of the larger research project (Smith et al., in prep). These visitor market segments were the *nature experience seekers* and the *nature explorers*. The *nature experience seekers* are generally first time visitors who participate in a large number of nature-based activities including site-seeing, bush walking, photography and swimming. Their main reasons for visiting a park include "to enjoy nature and the outdoors", "to rest and relax" and "to see the sights". *Nature explorers* also participate in a range of nature-based activities, but not as many as the *nature experience seekers*. Their main reason for visiting is predominantly "to enjoy nature and the outdoors" and they are generally repeat visitors. Additionally the park was suitable for the two interventions with Dales Gorge providing a suitably enclosed space, where the ranger

could be located to interact with visitors, and one main entry/egress point where research staff could be located to intercept visitors and distribute the surveys.

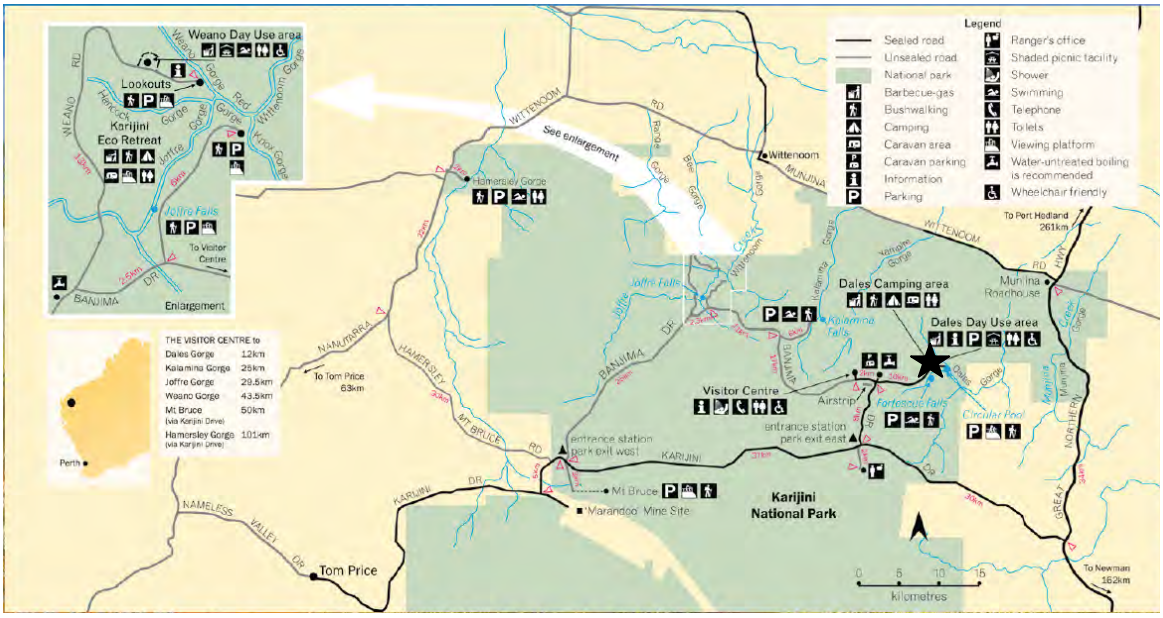


Figure 1: Map of Karijini National Park (taken from Karijini National Park: Information and walk trail guide). Star indicates Dales Gorge where surveys were distributed.

2. Methods

2.1 Interventions

For the ranger intervention, a Murdoch University staff member was dressed as a ranger and was primarily positioned at the stairs at the bottom of Dales Gorge from 9am to 3pm. They also walked around the Gorge and spoke to visitors as they were encountered. The intent was to display a demeanour of being friendly and responsive to visitors. The intervention pertaining to visitor information consisted of providing an A4, double sided sheet of information on the natural features of Dales Gorge (App. 1). Copies of this information sheet were attached to the information boards at both of the entrances to Dales Gorge which visitors could pick up and take with them.

These two interventions were specifically developed to try and affect the responses pertaining to overall views of experience and loyalty. Their effect on importance assigned to and satisfaction with particular attributes were also assessed. These included three attributes specifically relating to the interventions:

> *"Access to friendly, helpful rangers"*
>
> *"Presence of rangers"*
>
> *"Useful information on features of Dales Gorge"*

2.2 Survey development and distribution

A survey (App. 2) was developed for distribution to visitors. The survey consisted of questions pertaining to:

- Visit information (visitation frequency, length of stay, how heard about Karijini, visited Dales Gorge previously);
- Visitor information (age, numbers of adults and children in group, place of residence);
- Importance of nine, listed attributes to their visit;
- Satisfaction with same nine, listed attributes;
- Overall view of visit (three questions);
- Likelihood of undertaking eight, listed loyalty actions; and
- Level of interaction with rangers during visit to Dales Gorge.

The same survey was distributed regardless of the intervention undertaken. The surveys were distributed and collected at the main entry/egress point to Dales Gorge (Fig. 1) by Murdoch University researchers over 16 days in July 2012 to coincide with the school holiday period. The next available visitor was approached as they exited at the top of Dales Gorge and asked if they wished to participate. The exit to the Gorge (there are two) closest to the large Dales Gorge car-park was used as an interception point.

The effect of two interventions was evaluated via four treatments: 1) No intervention; 2) ranger present; 3) information available; 4) both ranger present and information available. The treatments were assigned four days each. The type of treatment and the day it occurred are outlined in the table below (Table 1).

Table 1: Type of treatment and day occurring (month of July 2012)

Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*	*Sunday*
				6th No intervention	7th No intervention	8th Ranger present
9th Ranger present	10th Ranger present	11th No intervention	12th Information available	13th Ranger present and information available	14th Ranger present and information available	15th Information available
16th Rest day	17th No intervention	18th Ranger present	19th Ranger present and information available	20th Information available	21st Ranger present and information available	22nd Information available

2.2 Data analysis

All data were entered into an Excel spreadsheet with each survey identified by date completed, survey number and type of intervention. Summary percentages and descriptive statistics were undertaken for each survey question (where appropriate). These form the basis of the *Results* section below. Additional analysis was undertaken to examine the effect of the two interventions on the level of importance and satisfaction with the nine attributes, the three questions relating to overall view of visit, and the eight loyalty behaviours. This was done through one-way ANOVAs to examine whether there were any statistically significant differences between means for the treatments. The differences between the means for when an intervention was occurring (i.e. over the 8 days when an intervention was occurring) and when it was not occurring were also calculated to clearly illustrate the impact of each intervention.

3. Results

The following are descriptive results based on the responses to the survey. The results are presented in four sub-sections – Visitor information, Visit information, Visitor experience and Analysis of interventions. While not in survey order, the relevant question number is indicated in the accompanying figures and tables. A total of 1482 visitors were approached with 1399 agreeing to participate in the survey. This provided a response rate of 94%. Of the 83 visitors who declined to participate, the main reasons provided were poor English comprehension or feeling they would not have enough time to complete the survey.

3.1 Visitor information

The range of age groups across the respondents was fairly consistent (Fig. 2). The 55-64 age group was highest with 19% of respondents and the 18-24 age group the lowest with 14% of respondents.

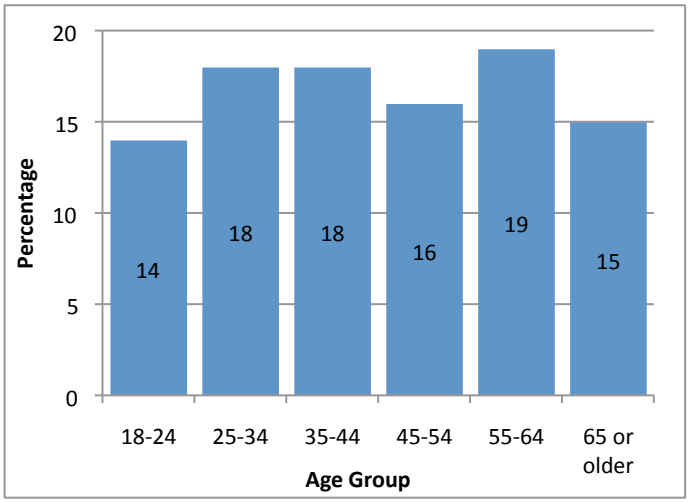


Figure 2: Age groups of respondents by percentage – Question 4 (N = 1366).

The majority of respondents were Australian (83%, Fig. 3). Further analysis of the postcodes provided by the Australian respondents indicated that 59% were from Western Australia with Victoria the next highest with 16% (Table 2). The lowest percentage of respondents was recorded from the Northern Territory with only 0.2%.

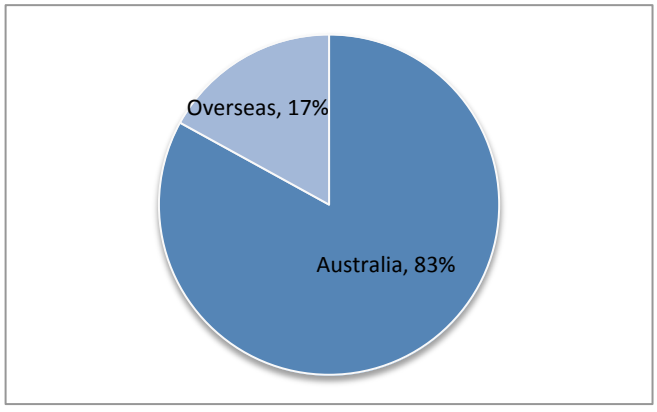


Figure 3: Place of residence of respondents – Question 11 (N = 1391).

Table 2: State of residence of Australian respondents – Question 11.

Australian state of residence	**%** (N = 1141)
Western Australia	59
Victoria	16
New South Wales	12
Queensland	6
South Australia	5
Tasmania	1
Northern Territory	0.2

Of the respondents who resided outside of Australia, 65% were from continental Europe and a further 22% were from the United Kingdom (Table 3). Respondents were also recorded from North America, the Pacific region, Asia and Africa.

Table 3: Region of residence for overseas respondents – Question 11.

Region of residence (outside of Australia)	**%** (N = 232)
Europe (excluding UK)	65
United Kingdom	22
North America	5
Pacific	5
Asia	2
Africa	1

3.2 Visit information

Respondents were asked to indicate how many times they had visited Karijini National Park, including their current visit. Nearly 80% of respondents indicated that this was their first visit, with only 2% of respondents indicating that they had visited over six times (Table 4).

Table 4: Visitation frequency of survey respondents – Question 1.

Visitation frequency	**%** (N = 1396)
First visit	78
Twice	14
Three to five times	6
Six to ten times	0.5
More than ten times	1.5

Respondents were most likely to be staying at Karijini National Park for longer than a day (Table 5), with 77% of respondents indicating that they were staying overnight. The average number of nights these respondents stayed was 3.01. Less than 5% of visitors were at Karijini for a short stop (under 2 hours).

Table 5: Length of stay in Karijini National Park – Question 2.

Length of stay	**%** (N = 1382)
Short stop (under 2 hours)	4
Half day (2 to 4 hours)	10
All day (5 to 8 hours)	9
Overnight	77
Number of nights	
1	11
2	33
3	32
4	15
5	5
Over 5 nights	4

When respondents were asked to indicate how they found out about Karijini National Park, 68% of respondents indicated that this was through "Word of mouth/friends" (Fig. 4). There was a substantial difference in percentages between this form of knowledge and the next two, "DEC internet/website" and "Visitor Centre (local tourism office)" which both recorded 11% of responses. This indicates that word of mouth is by far the most common way visitors are hearing about this National Park.

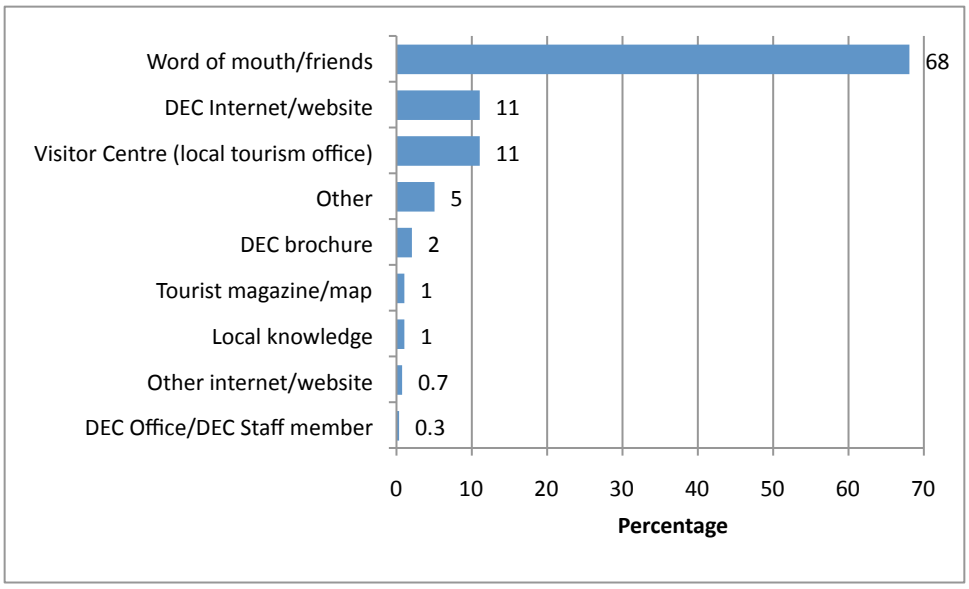


Figure 4: How respondents found out about Karijini National Park – Question 3 (N = 1344).

The responses provided by respondents under "Other" were summarised with tour group the most common form of response, followed by travel guide/book. Visiting for work purposes, visiting the local area and saw on map were other types of responses provided by respondents.

The number of adults and children in respondent groups was also asked in the survey. Over half of respondents indicated that there were two adults in their group, with the next highest percentage pertaining to four adults in their group (14%) (Table 6). Large groups were less common with only 11% of respondents indicating their group size was larger than 5 adults.

Table 6: Number of adults and children within respondent group – Question 10.

Number per group	Adults (%) (N=1384)	Children (%) (N = 544)
0	NA	19
1	7	15
2	57	37
3	9	14
4	14	6
5	1.5	3
6 to 10	7	4
11 to 15	3	2
16 to 20	1	0
21-25	0.2	0

Groups containing two children were most common with 37%, followed by no children (19%). Larger numbers of children per group (i.e. more than five children per group) were uncommon and constituted only 6% of responses.

3.3 Visitor experience

The following results for importance, satisfaction, overall view of visit and loyalty behaviours are based on the data collected on the days when no intervention was being undertaken (total number of surveys completed over the four days was 344). The purpose is to provide a snapshot of the experience of visitors on a "typical" day at Karijini National Park.

Respondents were asked to indicate the level of importance and their level of satisfaction with nine attributes relating to Dales Gorge. These were via 7-point Likert scales with 1 anchored with "not important at all" and "not at all satisfied" and 7 was anchored with "extremely important" and "extremely satisfied". These results are initially discussed separately, and then compared via gap and importance-performance analysis. The attribute that respondents deemed the most important was "Able to enjoy nature" (mean = 6.40, Table 7). This was followed by "Other visitors well-behaved" (mean = 5.94) and "Useful visitor guides and maps" (mean = 5.82). The attributes that were deemed least important related to rangers – "Presence of rangers" (mean = 3.78) and "Access to friendly, helpful rangers" (mean = 4.43).

Table 7: Mean level of importance of attributes of Dales Gorge – Question 5a.

Attributes	Mean	SD	N
Able to enjoy nature	6.40	1.00	339
Other visitors well-behaved	5.94	1.25	339
Useful visitor guides and maps	5.82	1.36	335
Useful information on the features of Dales Gorge	5.70	1.23	337
Value for money for fees paid to DEC	5.68	1.47	335
Clean, well presented toilet facilities	5.59	1.48	336
Well designed and maintained walking tracks/trails	5.46	1.41	336
Access to friendly, helpful rangers	4.43	1.79	337
Presence of rangers	3.78	1.77	333

Note: Measured on 7-point scale where 1 = not important at all; 4 = somewhat important; 7 = extremely important

Respondents also indicated that they were most satisfied with “Able to enjoy nature” (mean = 6.46, Table 8). The next highest means were for “Other visitors well-behaved” (mean = 6.10) and “Value for money for fees paid to DEC” (mean = 6.03). As per importance, the lowest means for satisfaction related to the two ranger-related attributes (Table 8).

Table 8: Mean level of satisfaction with attributes of Dales Gorge – Question 5b.

Attributes	Mean	SD	N
1. Able to enjoy nature	6.46	0.85	323
2. Other visitors well-behaved	6.10	1.22	322
3. Value for money for fees paid to DEC	6.03	1.21	315
4. Well designed and maintained walking tracks/trails	5.89	1.10	317
5. Clean, well presented toilet facilities	5.70	1.37	308
6. Useful visitor guides and maps	5.67	1.41	316
7. Useful information on the features of Dales Gorge	5.54	1.37	317
8. Access to friendly, helpful rangers	4.76	1.87	294
9. Presence of rangers	4.30	1.94	296

Note: Measured on 7-point scale where 1 = not at all satisfied; 4 = somewhat satisfied; 7 = extremely satisfied

Subtracting the mean for importance from the mean for satisfaction for each attribute calculates a gap value that can be a useful analysis tool for managers in reflecting the difference between mean importance and mean satisfactions scores for individual attributes. If positive, it indicates the level of satisfaction is greater than the importance of a particular attribute. If negative, it indicates the level of importance is higher than its level of satisfaction, providing an indication of where management attention may be needed. The significance of the differences in means was tested via paired t-tests. Gap analysis for the nine attributes used here (Fig. 5) indicates two attributes for which a negative gap occurs with “Useful information on the features of Dales Gorge” (gap value = -0.16) the only one that was deemed statistically significant. For the remaining attributes there were four attributes with statistically significant positive gap values, meaning that for visitors, their satisfaction with these attributes exceeded their importance.

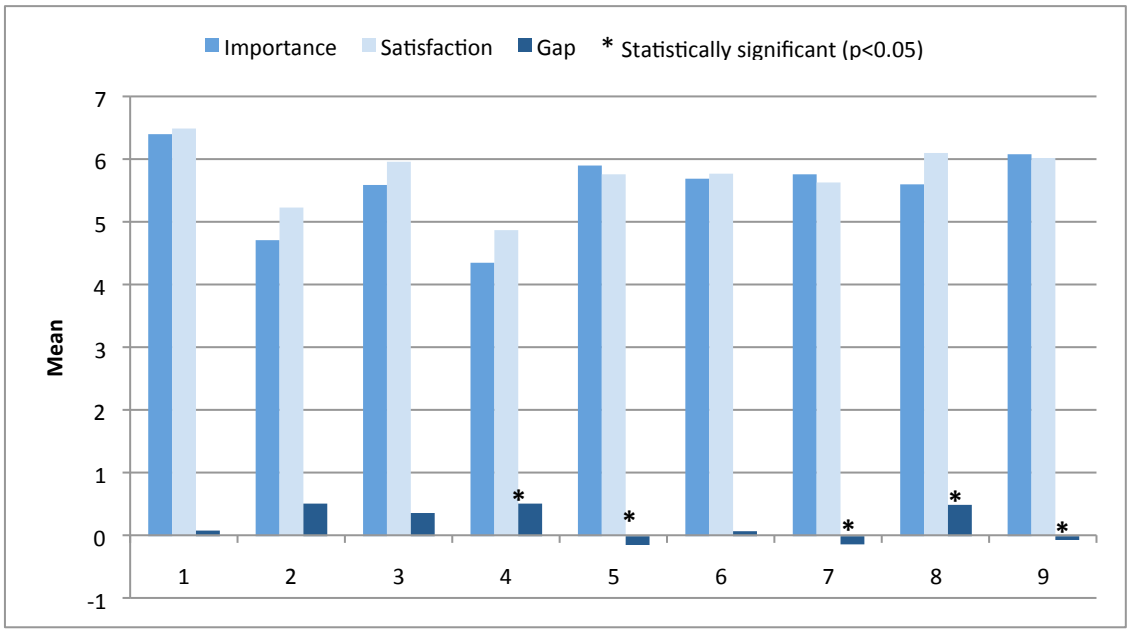


Figure 5: Mean levels of importance and satisfaction with gap analysis – Question 5a and b.

The means for importance and satisfaction were plotted within a two-dimensional grid with satisfaction on the *x* axis and importance on the *y* axis. The cross hairs for the quadrants were placed at the grand means of importance (grand mean = 5.42) and satisfaction (grand mean = 5.61) (Fig. 6). Locating the crosshairs at the grand means places attributes in all four quadrant enabling mangers to clearly identify those attributes that are performing relatively well or poorly compared to other attributes. Crosshairs can be placed at the scale means (here this would be 4), however for a park like Karijini, where most visitors are satisfied and most attributes are important, all the attributes would end up in the *keep up the good work* quadrant, which is of little help to managers in setting management priorities.

Results show five attributes clearly lying within the quadrant *keep up the good work*. The two attributes pertaining to rangers lie within the *low priority* quadrant, while "Well designed and maintained walking tracks/trails" lies within the *possible overkill* quadrant. One attribute lies within the *concentrate here* quadrant – "Useful information on the features of Dales Gorge" as the mean for satisfaction for this attribute was below the grand mean for satisfaction.

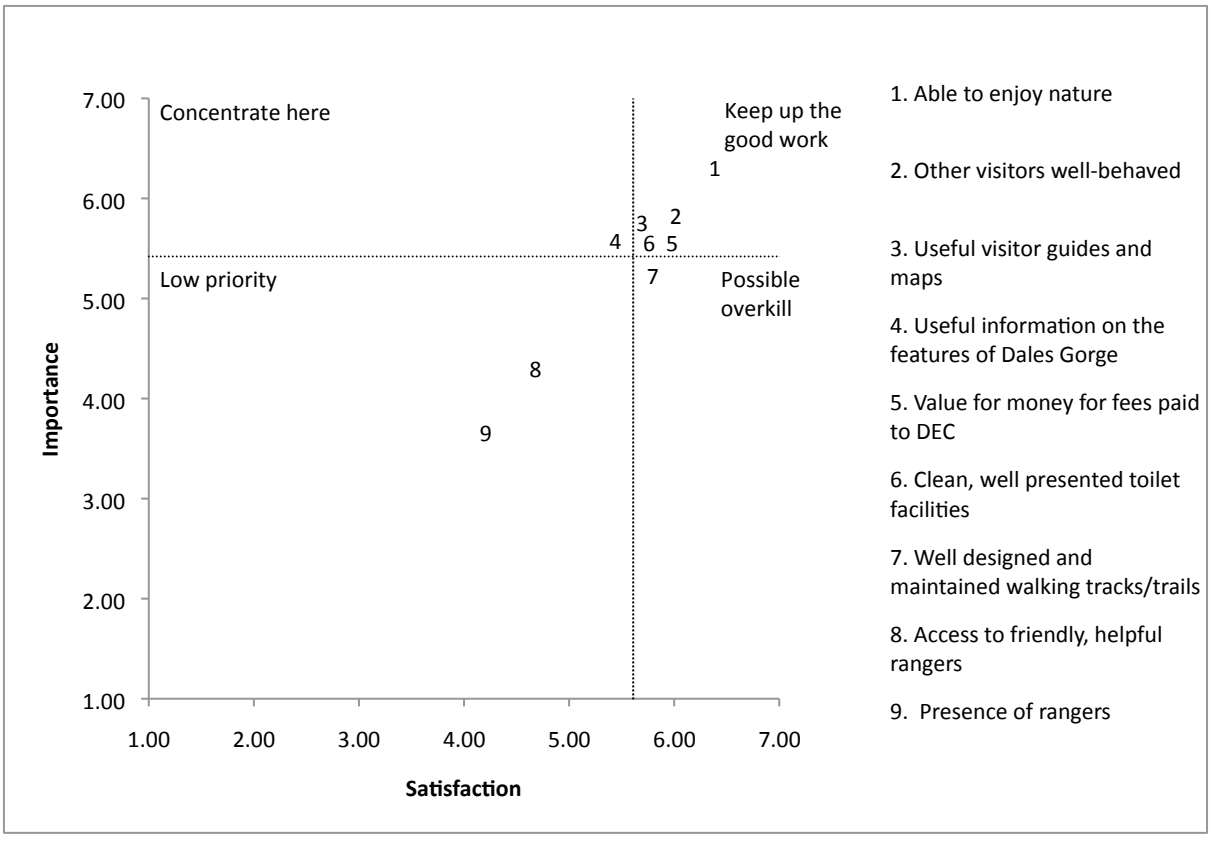
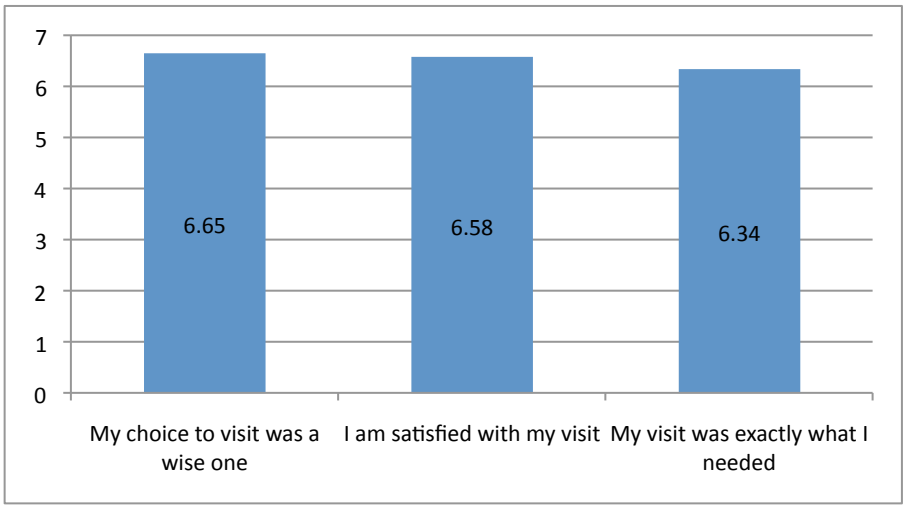


Figure 6: Importance-satisfaction analysis for all data against grand means.

Respondents were also asked three questions pertaining to their overall view of their visit to Dales Gorge. All three questions produced means over 6.0 (Fig. 7) indicating a strong level of agreement that their visit was satisfying (mean = 6.58), was a good choice (mean = 6.65) and was exactly what they needed (mean = 6.34). The percentages of respondents who indicated they agreed with these questions (i.e. 5, 6 or 7 on 7 point scale anchored with 1 being "strongly disagree" and 7 being "strongly agree") was also calculated. Between 94-98% of respondents indicated that they agreed with these questions.



Note: Measured on 7-point scale with 1 = strongly disagree and 7 = strongly agree.

Figure 7: Means for statements relating to overall view of visit – Question 6 (N = 1378).

Eight loyalty actions were included in the survey with respondents asked to indicate how likely they were to undertake the actions after their visit. Respondents were most likely to "Visit another national park in Australia" (mean = 6.68, Table 9), followed by "Say positive things about this park to other people" (mean = 6.64). Respondents were least likely to "Volunteer my time to help conserve this park or similar protected areas" (mean = 3.09) and "Pay increased park fees to improve park facilities and park management" (mean = 4.11).

Table 9: Mean level of likelihood to undertake loyalty actions – Question 7.

Loyalty action	Mean	SD	N
Visit another national park in Australia	6.68	0.78	343
Say positive things about this park to other people	6.64	0.71	341
Recommend to friends and relatives that they visit this park	6.59	0.80	341
Talk to other people about the importance of this park and other protected areas	5.54	1.47	339
Visit this park again	5.00	2.30	343
Donate money to help protect this park or similar protected areas	4.41	1.88	338
Pay increased park fees to improve park facilities and park management	4.11	1.94	340
Volunteer my time to help conserve this park or similar protected areas	3.09	2.02	335

Note: Measured on 7-point scale with 1 = very unlikely and 7 = very likely.

3.4 Analysis of interventions

Question 8, pertaining to interactions with rangers at Dales Gorge, was included to ascertain the level of ranger interaction with visitors on a normal day and the days when the ranger intervention was in place. Figure 8 (below) shows the results from the days that the ranger intervention was in place and the days that no ranger intervention was in place. When the ranger intervention was in place, 22% had no ranger interaction 28% had seen rangers and 44% of respondents had talked to rangers. On the days the ranger intervention was not in place, 68% of respondents had no interaction with rangers, while 16% had seen rangers and 13% had talked to rangers.

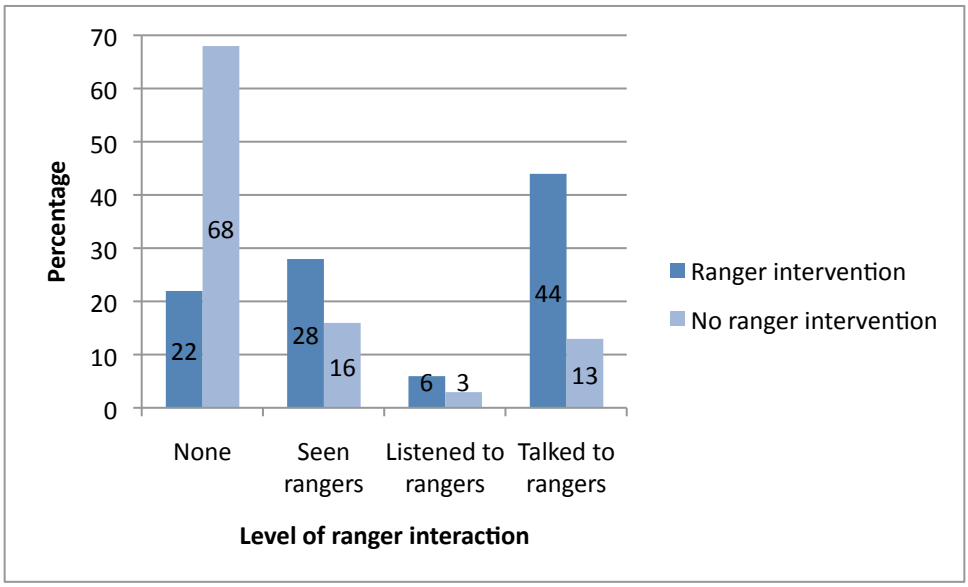


Figure 8: Level of ranger interaction – Question 8 (N = 1385).

This study aimed to test the effect of the presence of a staff member (e.g. ranger) and the provision of an information sheet on visitors' importance, satisfaction, overall view of visit and loyalty behaviours. This was examined in two-ways. Means were calculated from the responses for the sixteen days. ANOVAs were performed to determine if there were statistically significant differences between the means across the four treatments, with the results presented in the tables below. Finally, the difference between the means for the days the intervention occurred and did not occur was calculated and graphed.

Mean importance increased with the presence of the interventions and this was found to be statistically significant for five of the listed attributes (Table 10). The presence of the ranger had a statistically significant effect on the two attributes related to rangers, with both increasing in importance on the days the ranger was present and when both interventions were occurring. This intervention also had a statistically significant effect for "Well designed and maintained walking tracks/trails" and "Clean and well presented toilet facilities". Additional information provision had no significant change to importance for any of the attributes, with importance of provision of visitor guides, maps and information remaining high (means of 5.92 and 5.74 respectively).

The graph below shows the differences in means between the days when each intervention occurred and the days they did not occur (i.e. includes the days when an intervention was occurring on its own and when both were occurring on the same days). Most attributes show an increase in importance between the days when the interventions occurred and days when they were absent. Clearly evident in Figure 9 below is the large positive difference in means for the attribute "Presence of rangers" (9 in Fig. 9). This indicates that on the days the ranger was present, the level of importance respondents gave this item increased. A positive difference in mean level of importance was also seen for the other attribute relating to rangers (8 in Fig. 9). The attribute relating to "Useful information on the features of Dales Gorge" also showed a slight increase in the mean level of importance for the days when the information sheet was available (4 in Fig. 9). The presence of the ranger produced a slight

negative difference in means for the importance of “Able to enjoy nature” (1 in Fig. 9) while the availability of the information sheet produced a negative difference for “Value for money for fees paid to DEC” (5 in Fig. 9).

Table 10: Effects of interventions on attribute importance.

	Means				p-values	
Attributes	**None**	**Info**	**Ranger**	**Both**	**Ranger**	**Info**
1. Able to enjoy nature	6.40	6.44	6.43	6.38	0.82	0.97
2. Other visitors well-behaved	5.94	6.10	6.18	6.14	0.03*	0.29
3. Useful visitor guides and maps	5.82	5.92	5.91	6.00	0.27	0.24
4. Useful information on the features of Dales Gorge	5.70	5.74	5.72	5.88	0.32	0.25
5. Value for money for fees paid to DEC	5.68	5.40	5.58	5.75	0.21	0.55
6. Clean, well presented toilet facilities	5.59	5.58	5.68	5.91	0.01*	0.13
7. Well designed and maintained walking tracks/trails	5.46	5.30	5.70	5.72	0.00*	0.53
8. Access to friendly, helpful rangers	4.43	4.63	4.83	4.98	0.00*	0.51
9. Presence of rangers	3.78	4.30	4.72	4.62	0.00*	0.16

* indicates statistical significance (p-value <0.05)

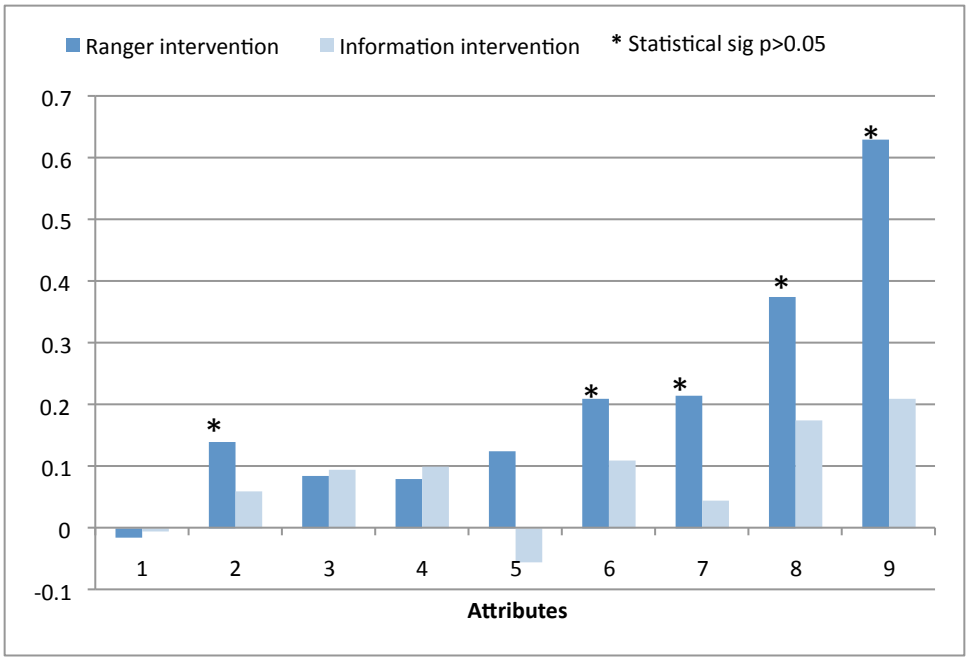


Figure 9: Differences in mean levels of importance when the ranger and information sheet interventions were present. Numbers for attributes relate to numbers in Table 10.

Similar to importance above, the level of satisfaction increased with the occurrence of the interventions for most of the attributes. The exception was “Other visitors well-behaved” which decreased when the interventions were occurring however this was not statistically significant (Table 11). For the ranger intervention, the increase in mean satisfaction for the attributes “Access to friendly, helpful rangers” and “Presence of rangers” were found to be statistically significant. For the information sheet intervention, a significant difference was identified for “Well designed and maintained walking tracks/trails” which showed the information sheet increased satisfaction levels.

The graph based on the differences in means again clearly illustrates the positive differences in satisfaction means for the two attributes relating to rangers when the ranger was present (8 and 9 in Fig. 10). There was also a small negative difference in mean for "Other visitors well behaved" (2 in Fig. 10) when the information sheet intervention was occurring. The lack of other obvious results may be due to respondents providing high satisfaction scores; therefore it would be hard to improve on what is already seen as good performance.

Table 11: Effect of interventions on attribute satisfaction.

	Means				p-values	
Attributes	**None**	**Info**	**Ranger**	**Both**	**Ranger**	**Info**
1. Able to enjoy nature	6.46	6.48	6.50	6.55	0.33	0.53
2. Other visitors well-behaved	6.10	5.90	6.04	6.07	0.49	0.29
3. Value for money for fees paid to DEC	6.03	6.11	6.04	6.23	0.47	0.11
4. Well designed and maintained walking tracks/trails	5.89	6.04	5.91	6.02	0.93	0.03*
5. Clean, well presented toilet facilities	5.70	5.75	5.76	5.91	0.20	0.26
6. Useful visitor guides and maps	5.67	5.81	5.83	5.81	0.33	0.46
7. Useful information on the features of Dales Gorge	5.54	5.68	5.59	5.74	0.52	0.10
8. Access to friendly, helpful rangers	4.76	4.90	5.55	5.73	0.00*	0.19
9. Presence of rangers	4.30	4.45	5.33	5.40	0.00*	0.44

* indicates statistical significance (p-value <0.05)

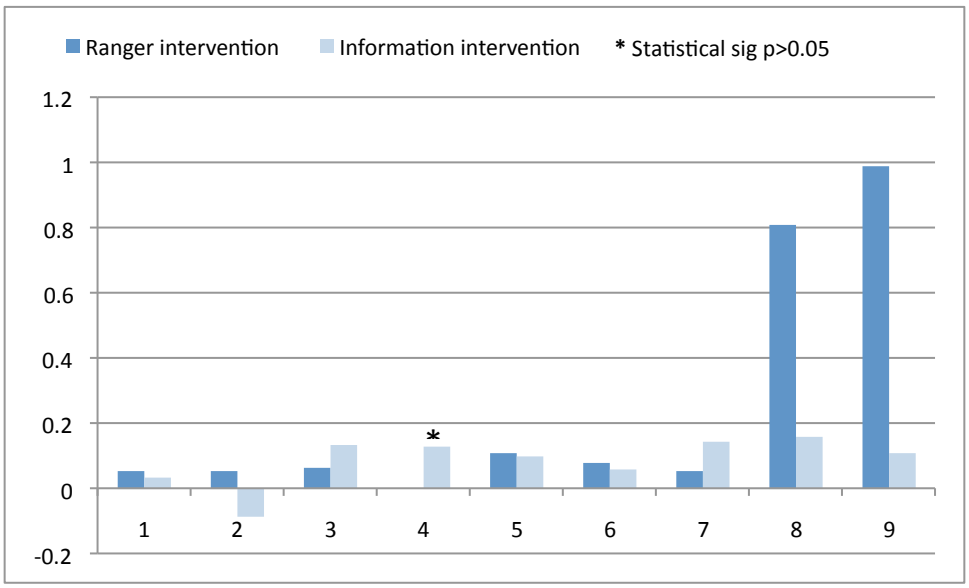


Figure 10: Differences in mean levels of satisfaction when the ranger and information sheet interventions were present. Numbers for attributes relate to numbers in Table 11.

The effect of the interventions on respondents' overall view of visit was not as straightforward as the importance and satisfaction results. There was a statistically significant decrease in the mean level of agreement with "My choice to visit was a wise one" and "My visit was exactly what I needed" when the information sheet intervention was occurring (i.e. Info and Both intervention treatment, Table 12).

Table 12: Effects of intervention on overall views of visit.

	Means				p-values	
Overall views of visit	**None**	**Info**	**Ranger**	**Both**	**Ranger**	**Info**
1. My choice to visit was a wise one	6.65	6.54	6.67	6.59	0.23	0.00*
2. I am satisfied with my visit	6.58	6.50	6.62	6.57	0.12	0.09
3. My visit was exactly what I needed	6.34	6.32	6.43	6.29	0.45	0.03*

* indicates statistical significance (p-value <0.05)

All three questions relating to the overall view of visit had a negative difference in means for the information sheet intervention (Figure 11). The ranger intervention did result in positive mean differences for these three questions. However, it should be noted that the differences in means are fairly small (i.e. less than 0.1) and satisfaction still remained very high.

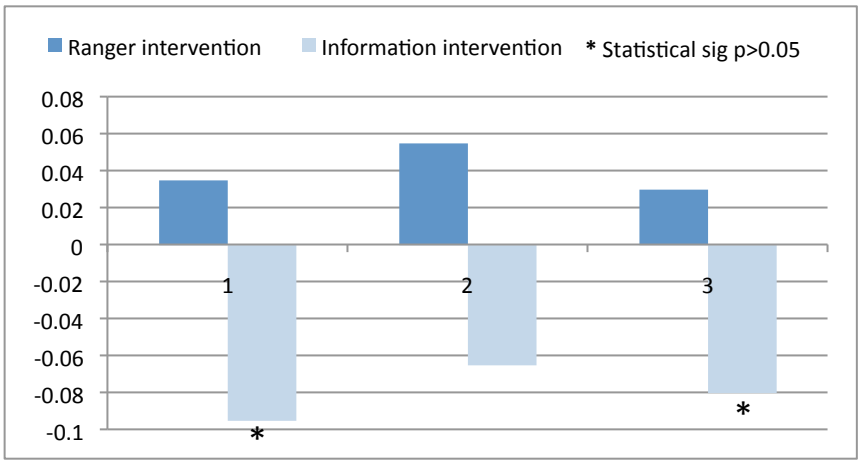


Figure 11: Differences in mean levels of agreement to overall view of visit questions when the ranger and information sheet interventions were present. Numbers for questions relate to numbers in Table 12.

The effect of the interventions produced no statistically significant differences in the means of willingness to undertake certain loyalty behaviours (Table 13). The means for these items remained fairly similar regardless of the intervention being undertaken.

Table 13: Effect of interventions on willingness to undertake loyalty behaviours.

	Means				p-values	
Loyalty action	**None**	**Info**	**Ranger**	**Both**	**Ranger**	**Info**
1. Visit another national park in Australia	6.68	6.68	6.76	6.67	0.42	0.31
2. Say positive things about this park to other people	6.64	6.60	6.65	6.60	0.94	0.28
3. Recommend to friends and relatives that they visit this park	6.59	6.60	6.57	6.58	0.63	0.75
4. Talk to other people about the importance of this park and other protected areas	5.54	5.72	5.68	5.70	0.50	0.24
5. Visit this park again	5.00	5.04	5.11	5.03	0.76	0.93
6. Donate money to help protect this park or similar protected areas	4.41	4.59	4.56	4.55	0.64	0.39
7. Pay increased park fees to improve park facilities and park management	4.11	4.48	4.48	4.19	0.72	0.70
8. Volunteer my time to help conserve this park or similar protected areas	3.09	3.45	2.94	3.12	0.47	0.33

* indicates statistical significance (p-value <0.05)

The figure below shows both the information sheet and ranger interventions producing small positive differences in means for three of the eight, listed loyalty behaviours, including “Talk to other people about the importance of this park and other protected areas” (4 in Fig. 12), “Donate money to help protect this park or similar protected areas” (6 in Fig. 12) and “Pay increased park fees to improve park facilities and park management” (7 in Fig. 12). The ranger intervention resulted in a negative mean difference for “Recommend to friends and relatives that they visit this park” (3 in Fig. 12) and “Volunteer my time to help conserve this park or similar protected areas” (8 in Fig. 12). For the information sheet intervention, negative mean differences are identified for “Visit another national park in Australia” (1 in Fig. 12), “Say positive things about this park to other people” (2 in Fig. 12), and “Visit this park again” (5 in Fig. 12).

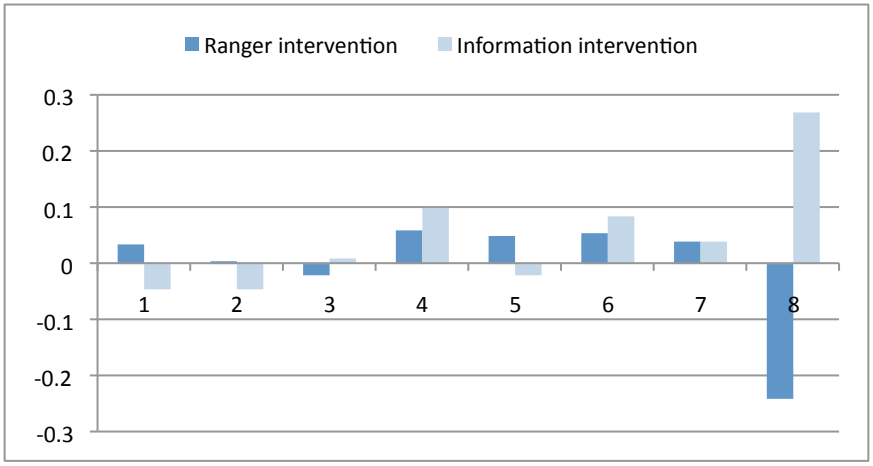


Figure 12: Differences in mean levels of willingness to undertake loyalty behaviours when the ranger and information sheet interventions were present. Numbers for attributes relate to numbers in Table 13.

4. Management implications

Overall, the presence of the ranger was the intervention that had the most effect on visitor experiences. It increased the mean level of importance and satisfaction with the two attributes pertaining to rangers, with no statistically discernible effect on overall view of their visit or their willingness to undertake loyalty behaviours. The results for the information sheet intervention were mixed. It had no effect on the feature "Useful information on features of Dales Gorge" but did however did produce a small positive effect on the feature "Well designed and maintained walking tracks/trails". It also was found to have a statistically significant negative effect on two of the questions pertaining to respondents' overall view of their visit.

Following the above, and incorporating the other results from the survey a number of management implications can be determined.

1. Profile of Karijini visitors

While there is no such thing as an average visitor, a few clear trends in relation to the visitors to Karijini National Park are evident. There was no dominant age group among respondents. Visitors are generally in small groups of 1-2 adults and none or 1-2 children. This supports current site design and development based on relatively small, well-spaced campsites (along with a few larger sites). Respondents were also generally on their first visit to Karijini National Park (78%) and were more likely to stay overnight (77%). As such, the current provision of maps and Park information by the campground hosts is very important. Given that almost a fifth of visitors are international (17%) having this information, and even signs, in a few languages other than English is important.

2. Sources of pre-visit information and current management

Most respondents (68%) heard about Karijini National Park through word of mouth suggesting positive wider views in the community about Karijini and its management. This conclusion is supported by the mean of 6.59 on a 7-point scale for being willing to "Recommend to friends and relatives that they visit this park" as did the mean for "I am satisfied with my visit" of 6.58 on a 7-point scale.

3. Presence of rangers

The presence of rangers affected the importance and satisfaction with the presence of and access to rangers. Confusingly, having rangers present and accessible was assigned a relatively low importance (relative to other attributes) by respondents, with the reason for this not easily discernible. The presence of the ranger had no effect on respondents' overall view of their visit, or on willingness to undertake loyalty behaviours. One possible reason for this lack of effect on overall view of visit is that the mean for these questions were already high, and it may be hard to improve further on what is already viewed as a satisfying visit. As such,

it seems that the presence of the ranger does help improve attribute performance, but has no impact on overall satisfaction (given that it is already high).

4. Providing information

The information sheet intervention had mixed results. Its effect on the attributes was less than the presence of rangers. For example, it only produced a statistically significant effect on satisfaction for one of the nine, listed attributes ("Well designed and maintained walking tracks and trails") and the reason for this relationship is unclear. It also produced a statistically significant decrease in means for two of the three questions pertaining to overall views of visit ("My choice to visit was a wise one" and "My visit was exactly what I needed"). Interestingly, this result suggests that providing the information negatively, rather than positively impacted on overall views of visit.

Whether this was as a result of the type of information provided is difficult to determine. For example, the information sheet contained descriptions of wildlife that are commonly found in the park. This may have created expectations among the visitors who took the information sheet that they would see these animals and they may not have been seen. This could lead to a potential lowering of their satisfaction ratings for the information sheet in that it created an expectation that was not fulfilled.

To identify why the results for the information sheet intervention were mixed would seem to require further exploration. Were the satisfaction ratings when visitors took the information sheet lower as it created expectations that were not fulfilled (as discussed above) or alternatively, was the information provided not what the visitors wanted. The results in this study indicate that visitors place importance on useful visitor guides and maps (importance mean = 5.82) and information on the features of Dales Gorge (importance mean 5.70), however the information sheet used in this study did not seem to meet visitor needs. Further research and investigation is required to determine what type of information visitors want to receive and the medium in which they would like to receive it. With the popularity of "smart phones" and social media increasing, the days of physical sheets of paper containing information may be a little out-dated and impractical for some visitors. Additionally, having a range of information sheets containing differing information may envelope the diverse range of visitors who visit Karijini National Park.

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6. Appendices

Appendix 1 – Information sheet

Karijini National Park: Dales Gorge

Welcome to Dales Gorge, one of the most spectacular gorges in Karijini National Park! The gorge provides a refreshing retreat from the arid plains above. Take a moment (or more!) to experience the natural beauty and history of this area; from the amazing rock formations to the cool, deep pools and variety of wildlife.

Geology

The plateau forming the Hamersley Range has been deeply dissected to reveal magnificent vertical exposures of 2,500 million year old red rocks known as banded iron formation (BIF). These rocks record a time during the Achaean when little oxygen filled the atmosphere and the only forms of life were simple bacteria and algae.

Erosion occurred when a sharp drop in sea level caused rivers to down cut rapidly to a new base level. The process was enhanced by the onset of a more arid climate, which depleted the protective vegetation on the valley sides.

The BIF is very resistant to weathering and forms steep cliffs, whereas layers of softer shale and dolomite are less resistant and form gentle slopes. Together, this alternation of rock types forms the slope and step appearance of Dales Gorge.

Former valley floor sediment, known as pisolite, now stands high above the present day river bed at several locations, including Circular Pool. It consists of cemented iron rich gravel and was formed before the recent phase of down cutting began. Relict slope deposits, consisting largely of cemented fragments of banded iron formation, also date from this time.

Water

Dales Gorge is carved into the large plateau of the Hamersley Range. The plateau forms the watershed between the Fortescue River to the north and the Ashburton River to the south.

Dry for most of the year, the river flowing through the Gorge is a tributary of the Fortescue River. The pools in the Gorge, including Circular Pool and Fern Pool, are important permanent water sources.

The water in Fern Pool is warmer than in other pools in the Gorge because it has flowed across rocks warmed by the sun. In contrast, Circular Pool is much colder, being sourced from water coming directly out of cracks and only receiving direct sunlight for a short time each day.

Prepared by S. Hassell (2012) Murdoch University

Wildlife

In and around Dales Gorge is a wide variety of wildlife; including reptiles, birds, mammals and plants. Some may be easily visible, others may be harder to see. Wildflowers vary in abundance with the season. Look closely and you may see some of the residents of Dales Gorge.

Reptiles

Pilbara Olive Python
(Liasis olivaceus barroni)

Olive pythons generally occupy areas of habitat that have rocky escarpments surrounded by permanent or seasonal water, like Dales Gorge. Often they can be found submerged in these rocky pools waiting for potential prey to wander by. The deep rocky caves and ledges offer a perfect place for shelter. Non-venomous.

Reptiles

Ring-tailed Dragon
(Ctenophorus caudicinctus)

The Ring-tailed Dragon prefers open rock slopes with large rocks and boulders. They use rock crevices to shelter from predators or from the sun in summer. Insects are their main diet. They rely on the sun for warmth so in the mornings can often be found basking in the sun on bare rocks, or vertically on shrubs or branches. They are a summer breeding species. Can you spot one?

Plants

Silver Leaved Paperbark/ Cadjeput
(Melaleuca argentea)

Look for this medium sized tree near the water's edge down in the Gorge. The bark is papery to touch and the leaves are aromatic when crushed. The cream coloured 'bottle brush' flowers attract many bird species.

Native Fig
(Ficus brachypoda)

The native fig has small round fruit. When they turn orange they are ripe. They have fruit most of the year round. The trees grow in Karijini's gorges and near the gorge rim. The roots cling to rocks and travel down the gorge walls to water.

Birds

Western Bower Bird
(Chlamydera guttata)

Often spotted at Circular Pool, the Western Bower Bird measures between 24–28 cm in length and weighs between 120-150 g. Both sexes are similar in size and dimensions, except that the tail of the female is slightly longer. White and green objects are collected to decorate their bower (nest).

Zebra Finch
(Taeniopygia guttata)

You might recognise these birds as they are common pets around the world. Males are more brightly coloured than females, with orange cheeks and flanks. Both have bright red beaks with black and white tails. See if you can see them drinking by the pool's edge.

Appendix 2 – Visitor survey

Visitor Survey

We value your feedback

Dear Visitor,

Welcome to Karijini National Park, managed by the Department of Environment and Conservation (DEC).

We'd like to know your views about your visit here. Your feedback will help DEC manage this area better.

Once you have completed the survey, please return it to the Murdoch University researcher.

Thank you for sharing your thoughts and ideas.

Murdoch UNIVERSITY

If you have any questions or concerns regarding this survey, please contact us, or alternatively you can contact Murdoch University's Human Research Ethics Committee on (08) 9360 6677.

Q1. Including this visit, how many times have you visited Karijini National Park? *Please tick [✓] one box only*

❑ First visit ❑ Twice ❑ Three to five times

❑ Six to ten times ❑ More than ten times

Q2. How long did you (plan to) stay in Karijini National Park on this visit? *Please tick [✓] one box only*

Short stop (under 2 hours) ❑ Half day (2 to 4 hours) ❑ All day (5 to 8 hours) ❑ Overnight (how many nights?) _____

Q3. How did you find out about Karijini National Park? *Please tick [✓] one box only*

❑ Word of mouth/friends ❑ Visitor centre (local tourism office) ❑ DEC Internet/website

❑ Local knowledge ❑ DEC office/DEC staff member ❑ Other internet/website

❑ Tourist magazine/map ❑ DEC brochure ❑ Other _____

Q4. Which age group do you belong to?

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

THE FOLLOWING QUESTIONS RELATE TO YOUR VISIT TO DALES GORGE TODAY

Q5. Your experiences of the features of DALES GORGE (*Please complete both A & B*).

	(A) How important is each feature to the quality of your visit to Dales Gorge today?							**(B) How satisfied were you with your experience with each feature at Dales Gorge today?**						
	Not at all important			Somewhat important			Extremely important	Not at all satisfied			Somewhat satisfied			Extremely satisfied
Able to enjoy nature	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Access to friendly, helpful rangers	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Well designed and maintained walking tracks/trails	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Presence of rangers	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Useful visitor guides and maps	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Clean, well presented toilet facilities	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Useful information on the features of Dales Gorge	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Value for money for fees paid to DEC	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Other visitors well-behaved	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Q6. Please circle the number that best reflects your <u>overall views</u> about your visit to DALES GORGE today. *Please answer all questions*.

	Strongly Disagree						Strongly Agree
I am satisfied with my visit	1	2	3	4	5	6	7
My choice to visit was a wise one	1	2	3	4	5	6	7
My visit was exactly what I needed	1	2	3	4	5	6	7

Q7. Based on this visit to DALES GORGE today, please circle the number that indicates how likely you are to take each of the following actions <u>within the next twelve (12) months</u>. *Please answer all questions.*

	Very Unlikely						Very Likely
Recommend to friends and relatives that they visit this park	1	2	3	4	5	6	7
Donate money to help protect this park or similar protected areas	1	2	3	4	5	6	7
Say positive things about this park to other people	1	2	3	4	5	6	7
Volunteer my time to help conserve this park or similar protected areas	1	2	3	4	5	6	7
Pay increased park fees to improve park facilities and park management	1	2	3	4	5	6	7
Talk to other people about the importance of this park and other protected areas	1	2	3	4	5	6	7
Visit this park again	1	2	3	4	5	6	7
Visit another national park in Australia	1	2	3	4	5	6	7

Q8. What level of interaction have you (or your group) had with rangers during your visit today at DALES GORGE? *Please tick [✓] one box only*

❑ None ❑ Seen rangers ❑Listened to rangers ❑ Talked to rangers

Q9. Have you visited DALES GORGE previously?

❑ No ❑ Yes – yesterday ❑Yes – number of days ago _____ ❑ Yes – number of months ago _____ ❑ Yes – number of years ago _____

Q10. Including yourself, how many people in your personal (i.e. family) group are adults and how many are children?

Number of adults _____ Number of children (aged 17 and Under) _____

Q11. Where is your usual place of residence?

❑ Australia - Postcode _____ ❑ Overseas - Country_____

Thank you for participating. Your contribution will help to manage this Park better.

Office use only

Date: _____

Survey Number: _____

Surveyed previously Yes No

Treatment: _____