

AN INVESTIGATION INTO THE CONCEPT OF AND FACTORS LEADING TO IMPACT CREEP AND ITS MANAGEMENT



Amanda J. Smith and David Newsome

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LIST OF ABBREVIATIONS AND ACRONYMS

CALM	Western Australian Department of Conservation and Land Management
DOLA	Department of Land Administration
ROS	Recreation Opportunity Spectrum
TTW	Tree Top Walk
WATC	Western Australian Tourism Commission
2WD	Two-wheel drive vehicle
4WD	Four-wheel drive vehicle

ABSTRACT

This study defines and explores the nature of impact creep within the context of two contrasting case studies. The methods applied in undertaking this study consisted of a literature review and development and distribution of questionnaires to visitors at Monkey Mia and an interview of managers at Monkey Mia and Tree Top Walk. The project considered impact creep relevant to both public and private facility developments.

Impact creep can be defined as a temporal sequence of changes that lead to a site being more developed. These changes confer both negative and positive impacts. Each impact creep situation may be deemed unique according to different tourism situations and attractions.

Both Tree Top Walk and Monkey Mia have a history of increasing visitation which has increased the potential for further impacts. Management has responded accordingly and the resultant actions have reduced negative environmental impacts through site hardening and associated developments. The resultant development in turn appears to have contributed to an increased attractiveness for a wider visitor profile.

At both Monkey Mia and the Tree Top Walk increasing visitor numbers were not an immediate concern. Generally visitors to both sites are predominantly first time visitors on a multi-destination trip. Visitors to these sites are most likely to visit in family groups or with friends of two to four persons, aged in the 25 to 49 year age bracket. In both surveys there were a higher proportion of females to males. At Monkey Mia, the majority of respondents are from overseas and Western Australia with the lowest proportion from interstate. In contrast, at Tree Top Walk, the proportion of overseas, Western Australia and interstate visitors was fairly even. Respondents were most likely to travel to the respective regions in passenger vehicles and generally stay for short visits (less than a week). The main attraction for respondents was the natural area attraction, i.e. dolphins at Monkey Mia and the Tingle forest/Tree Top Walk at the Valley of the Giants.

The Monkey Mia visitor survey was also used to determine if management actions of site hardening detract from the visitor experience and to determine how visitors feel about highly developed sites such as those that contain permanent accommodation facilities and infrastructure. The survey revealed that visitors generally prefer natural landscapes with limited facilities. However, the facilities provided were not seen as being detractive and had no influence on the quality of the visit. Moreover, facilities may be considered as a positive influence because of the convenience they offer.

A major difference between the two case studies is that impact creep has occurred according to different policy directives. Tree Top Walk was developed under a management plan that had clear guidelines. Monkey Mia had no management plan and joint management with the Shire of Shark Bay. When accommodation facilities were developed at Monkey Mia, the Western Australian Department of Conservation and Land Management (CALM) recommendations were ignored in favour for economic returns and political pressure. A notable difference between the two sites, therefore, is that Tree Top Walk has no accommodation facility so the visitation period is short, while Monkey Mia has accommodation which means that limiting visitor use is problematic because as many as 600 people stay in the vicinity of the interaction area overnight.

For Tree Top Walk a dispersal strategy in the form of a visitor centre may help to focus attention away from the main attraction during busy periods and during wait times if restrictions are operating due to heavy demand. Because of the potential for increased visitation, crowding, conflicts and reduced visitor satisfaction at Monkey Mia limitations on use may have to be applied. Previous work has shown that use/access restrictions, in the form of a reservation or permit system, may be the best approach.

SUMMARY

Objectives of Study

This project involved the following three key objectives:

1. To define and explore the nature of impact creep.
2. To understand impact creep in the context of two contrasting case studies. Subsidiary objectives relating to these case studies include:
 - to explore what processes and strategies are employed in the decision making process in relation to site hardening.
 - to determine if management actions of site hardening detract from the visitor experience.
 - to determine how visitors feel about highly developed sites such as those that contain permanent accommodation facilities and infrastructure.
3. To provide a management perspective on impact creep.

Methodology

The methods applied in undertaking this study consisted of a literature review and development and distribution of questionnaires to visitors at Monkey Mia and an interview of managers at Monkey Mia and Tree Top Walk. The project considered impact creep relevant to both public and private facility developments.

Key Findings

Impact creep can be defined as a sequence of changes that lead to a site being more developed. These changes confer both negative and positive impacts. Each impact creep situation may be deemed unique according to different tourism situations and attractions.

Both Tree Top Walk and Monkey Mia have a history of increasing visitation which has increased the potential for further impacts. Management has responded accordingly and the resultant actions have reduced negative environmental impacts through site hardening and associated developments. The resultant development in turn appears to have contributed to an increased attractiveness for a wider visitor profile. The Monkey Mia survey revealed that visitors generally prefer natural landscapes with limited facilities but the facilities provided were not seen as being detractive and had no influence on the quality of the visit. Moreover, facilities may be considered as a positive influence because of the convenience they offer.

A major difference between the two case studies is that impact creep has occurred according to different policy directives. Tree Top Walk was developed under a management plan that had clear guidelines. Monkey Mia had no management plan and joint management with the Shire of Shark Bay. When accommodation facilities were developed at Monkey Mia, CALM recommendations were ignored in favour for economic returns and political pressure. A significant difference between the two sites, therefore, is that Tree Top Walk has no accommodation facility so the visitation period is short. Monkey Mia has accommodation which means that limiting visitor use is problematic because as many as 600 people stay in the vicinity of the interaction area overnight.

For Tree Top Walk a dispersal strategy in the form of a visitor centre may help to focus attention away from the main attraction during busy periods and during wait times if restrictions are operating due to heavy demand. Because of the potential for increased visitation, crowding, conflicts and reduced visitor satisfaction at Monkey Mia limitations on use may have to be applied. Previous work has shown that use/access restrictions, in the form of a reservation or permit system, may be the best approach.

Future Action and Suggestions for Further Research

The two case studies presented in this report give rise to several avenues of further research. The first avenue involves an exploration of the question as to why limiting use has not been applied at Monkey Mia. Additional comparative studies that explore politico-social, cultural and environmental differences and similarities to sites such as Monkey Mia will help us to understand such situations further. A suitable comparative study could include the Phillip Island Penguin Parade where the creep process has extended to a form beyond that currently seen at monkey Mia. Following on from this and particularly applicable to the Tree Top Walk facility in Western Australia is the question as to why site hardening has been a favoured visitor management strategy. There are no doubt good reasons as to why both Monkey Mia and the Tree Top Walk have evolved in the way they have but the process of change over time (impact creep) needs to be understood better in the wider Australian context.

The work presented in this report requires extension in order to gain a deeper insight into visitor perspectives on what management styles ('hard' and 'soft' approaches) are acceptable in natural areas and to ascertain at what stage certain groups/types of visitors become displaced due to on-site hardening and/or facility development.

Concurrent with this would be additional data collection on what the main driving force is in the management decision-making process in choosing to harden a particular site. Connected with this is the managerial perspective on the relative utility and effectiveness of 'hard' versus 'soft' approaches. Further case studies are also required in order to explore how hard approaches and impact creep might lead to new tourism facility proposals and subsequent government approval of developments such as tourist resorts.

There remains the important question of whether site hardening makes an attraction more appealing to certain/more types of tourists and how can different types of tourists be targeted for soft visitor management approaches such as interpretation and adherence to codes of conduct? Moreover, at what stage (or what is the main controlling factor) does the evolving site become more attractive to developers who may wish to submit proposals for accommodation and/or other facilities? Alternatives to impact creep and over development need to be explored at the regional level in Australia. The viability and relative success of soft versus hard visitor management approaches requires further study especially where the management preference and societies choice would be to 'develop' and maintain a variety of nature based experiences in the more remote parts of Australia.

Chapter 1

INTRODUCTION

This introductory section will include material on nature based tourism in general, the impacts as a result of recreation in natural areas, the positive and negative consequences of tourism development in natural areas, a profile of natural area tourists and will explore the concept of impact creep. This information is essential to provide background and ideas pertaining to the concept of impact creep as defined in this report. Nature-based tourism is a major contributor to the tourism industry in Western Australia. Nature based tourism is defined as tourism activities depending on the use of natural resources which remain in a relatively undeveloped state, including scenery, topography, waterways, vegetation, wildlife and cultural heritage (Ceballos-Lascurain 1996). Nature based tourism attractions worldwide have experienced rapid growth in demand since the mid-1980's in association with the ecotourism phenomenon (Higham 1998). In Australia, recreation is provided for in national parks, state forests, state recreation areas, marine parks and regional parks. These areas are increasingly important for nature-based tourists. An estimated 60% of the Australian population and some 42% of international tourists visit parks and reserves each year (Dept of Industry Tourism and Resources 1998). The Tourism Forecasting Council expects around 10.4 million visitors per year to be coming to Australia by 2012. This represents a doubling of the current annual number of international visitors. Additionally, domestic tourism is expected to grow by 20% over the same period (Dept of Industry Tourism and Resources 2002). Since the demand for natural area recreation and tourism is increasing and the area of the resource remains largely static, it is important that informed management decisions are made to minimise the impact from increasing recreation and tourism pressure.

Various studies have reported that the impacts as a result of recreation in natural areas include: increased soil compaction, track formation, loss of ground cover, vegetation damage, change in species composition, destruction of tree production through removal of seedlings, reduction of organic matter, eroded surfaces and tree root exposure (Blakesley & Reese 1988; Cole 1983, 1990, 1995; Cole & Monz 2004; Leung & Marion 2000b; Martin, McCool & Lucas 1989; Newsome, Moore & Dowling 2002; Smith & Newsome 2002; Trumbull, Dubois, Brozka & Guyette 1994). Martin et al. (1989) also stated that while these impacts do not threaten the ecological integrity of the entire area, they might result in serious localised resource damage and carry the potential to affect the quality of visitor experience.

A further impact associated with the growth of nature-based tourism is the increase in incidental tourist contact with wildlife. Incidental contact is when tourists encounter and perhaps impact wildlife inadvertently while engaging in other tourist activities (Grossberg, Treves & Naughton-Treves 2003; Higham 1998). In other instances spectacular and charismatic species become the focus of specific tourism activity. Non-consumptive wildlife interaction, whether it is incidental or focused has a variety of negative impacts on wildlife. Various studies have found that these interactions may result in the harassment of animals that may be in the form of creating unintentional, stressful situations, which may result in behavioural responses such as avoidance, attraction or habituation and changes in wildlife physiology, reproduction, population levels, and species composition and diversity (Burger & Gochfield 1998; Cole & Landres 1995; Duffus & Dearden 1990; Fowler 1999; Gabrielsen & Smith 1995; Gill, Sutherland & Watkinson 1996; Green & Higginbottom 2001; Grossberg et al. 2003; Hammitt & Cole 1998; Higham 1998; Knight & Gutzwiller 1995; Kuss, Graefe & Vaske 1990; Mann & Kemps 2003; Newsome et al. 2002; Orams 1997, 2002; Roe, Leader Williams & Dalal Clayton 1997).

Tourist use of areas can be facilitated by provision of roads, picnic sites, viewing platforms, boardwalks and visitor centres. Such features also help management to control access and can aid in preventing visitors dispersing over wide areas. Visitor impacts can thus be confined to more intensively used areas that can be targeted for most management effort.

In addition to this, and depending on economic and socio-political circumstances, tourist infrastructure in the form of campsites, eco-lodges, hotels and resorts may be developed in response to the popularity of a nature based tourist attraction. When permanent accommodation is developed, access corridors and facilities such as roads, car parks and boat ramps may be upgraded and/or constructed. In addition to this there are infrastructure requirements such as power and water supply and the need for waste disposal. The scale of such needs is clearly dependent on how many people are utilising the site and on the nature of activities that take place.

The following section describes the positive and negative consequences of tourism development in natural areas with a focus on remote, peripheral and insular destinations.

Tourism Infrastructure

Effective tourism management entails balancing conflicting ecological, social and economic pressures. Natural area managers are faced with providing a quality tourism experience, that guarantees continuing revenues, whilst

ensuring that conservation priorities are upheld (Goodwin, Kent, Parker & Walpole 1998). As discussed previously, tourism like any industry has environmental costs. To minimise impacts, a high degree of control over the interface between tourism and the natural environment is required, however such control is rarely achieved (Goodwin et al. 1998). There is often a trade-off between total protection and providing an adequate visitor experience. As such, a certain level of disturbance may be considered acceptable given the associated benefits (Goodwin et al. 1998). Managers have a duty to limit tourism where it threatens the integrity of a protected area, however, they must equally provide a quality visitor experience if tourism is to be maintained as a function of protected areas. The solution is to provide a combination of relevant marketing, education and product reorientation (Goodwin et al. 1998).

Often tourism is developed by external agents who take the majority of the emerging financial benefits. It should be cautioned that unplanned and inappropriate development may generate an oversupply of tourism facilities (Buhalis 1999). This is particularly evident in remote, peripheral and insular destinations. Various studies report several consequences of tourism development in remote, peripheral and insular destinations as highlighted in Table 1.

Table 1: Positive and negative consequences of tourism development

POSITIVE CONSEQUENCES	NEGATIVE CONSEQUENCES
Catalyst for national and regional development and improved tourism related infrastructure such as roads, airports, and accommodation.	Destinations may be forced to develop tourism that may evolve to mass tourism as planners either fail to limit development or to implement plans against politicians, industry and developers
Contribution to gross domestic product and government revenue	Principals may be unable to attract their intended target markets and therefore rely heavily on discounting for attracting consumers
Provides a boost for local manufacturing and industry, as well as agriculture	Principals may also depend heavily on distribution channel members, such as tour operators, for achieving their financial targets
Employment provided for local people	Locals generally hold poor quality and low paying jobs that mostly involve manual or service work
Can positively contribute to the conservation, protection and restoration of natural ecosystems	Destinations are sold on price rather than their merit or attributes
	Environmental and socio-cultural resources face degradation and their sustainability is seriously jeopardised
	Facilities and services suffer because of lack of profit preventing enterprises from renovating facilities, hiring and training qualified personnel, and reducing the quality of the product
	The destination may be developed to a point where the experience of visitors and the quality of life for locals is jeopardised
	Resentment, antagonisms and alienation may emerge locally against tourism investors, managers, or those with a conflicting view
	Economics motivates and leads development
	Local residents may suffer a loss of sense of place, as his/her surrounding is transformed to accommodate the requirements of a foreign-dominated tourism industry
	Can negatively contribute to the degradation of natural ecosystems
	Waste outputs, energy use, water resource pressure

Derived from Buhalis 1999; Mbaiwa 2003; Turton & Stork 2004; Welford, Ytterhus & Eligh 1999; and Yu, Hendrickson & Castillo 1997

In light of the above negative consequences, tourism should be developed through partnerships between both the public and private sectors and as such should aim to (Buhalis 1999):

- Maximise the benefit of tourism for the local society.
- Maximise the satisfaction of customers/tourists.
- Sustain local resources in the long term.
- Maximise the profitability of tourism enterprises.

Destinations that are well managed with appropriate infrastructure and tourists that are knowledgeable and aware assist in complementing natural attributes and contribute to satisfaction (Deng, King & Bauer 2002).

Profile of Natural Area Tourists

Hammitt and Cole (1998), Leung and Marion (2000b), Marion (1995), Marion and Farrell (2002), and Smith (2003) highlighted that the provision of facilities at campsites encourages the spatial concentration of activities, however, these studies did not explore how the provision of facilities would impact on the visitor experience. There are very few studies that explore the effects that infrastructure have on the visitor profile or natural area attraction. This section provides examples where in response to increasing visitor use and environmental impacts, development has occurred as a management option to reduce impacts. These examples also highlight the change in visitor profile and resultant behaviours as a consequence of development. (Hammitt & Cole 1998; Leung & Marion 2000a; Marion 1995; Marion & Farrell 2002; Smith 2003)

Duffus and Dearden (1990) proposed a conceptual framework that was applicable to non-consumptive wildlife tourism. Of interest for the purpose of this report is the aspect of the human user. Duffus and Dearden (1990) stated that through time a site may develop a public image through the growth in publicity and facilities designed to service the visitors who arrive at a natural area to encounter wildlife. As the facilities expand, this in turn influences the types of individuals who visit a site, the expectations, and the satisfaction derived from the attraction (Duffus & Dearden 1990).

It was considered that visitors attracted to viewing wildlife initially are dominated by wildlife specialists (Duffus & Dearden 1990). Specialists require little infrastructure or interpretive facilities and their presence are usually absorbable by existing social and ecological systems at the site. They are likely to have pre-knowledge of the site and the constituent wildlife attraction and are few enough in number to require little management intervention (Duffus & Dearden 1990). As awareness of the site and associated activity grows, a less ambitious user will dominate the group. As a result, there will be an accompanying demand for more facility development, more mediation and increased pressure on both the social system and ecosystem of the host area (Duffus & Dearden 1990). Eventually as visitor numbers continue to increase, general tourists dominate that rely heavily on the development and supportive infrastructure and greater management intervention may be required due to the increased pressure on the host society and ecosystem (Duffus & Dearden 1990). Specialists may be displaced to less developed sites as the original site may no longer fulfil the expectations of the specialist. As illustrated above, coupled with these changes in the user group are changes in the overall character of the site towards increased infrastructure (Duffus & Dearden 1990).

An example of the human user profile, as described by Duffus and Dearden (1990), was given by Higham (1998) at the Northern Royal Albatross Colony, Taiaroa Head, New Zealand. Domestic and international tourists are attracted to Taiaroa Head due to the presence of the Northern Royal Albatross (*Diomedea epomophora sanfordi*) colony and marine wildlife on the headland (Higham 1998). Tourism has been occurring at this site since 1964 and was viewed prior to this in small numbers, mostly by local residents, since 1919, making it one of the longest established cases of commercial wildlife tourism in New Zealand (Higham 1998). Guided tours of the colony have been conducted since 1972. These tours operated on a restricted basis with tours restricted to two afternoon tours of no more than ten people, on three days of the week. In 1983, a specialised viewing facility was constructed to accommodate increasing visitor numbers and demands for increasing daily tours and days of operation. In 1998, a reception facility was constructed and by 1991, up to 21 daily tours, with a significantly higher average tour size, were available departing half-hourly between 9.30am to 8.00pm on every day of the year except Christmas Day (Higham 1998). The increase in average tour size resulted in tourists being more likely to experience a crowded reception area and viewing facilities. Additionally, most afternoon guided tours were operating at maximum capacity due in part to the arrival of increasing numbers of visitors on scheduled tour coaches with capacities three times that of the observatory (Higham 1998). An additional impact of increasing visitor complexity with a higher international component also resulted in an accentuation of seasonal extremes with visitor number increases most prevalent in the high season (Higham 1998).

Annual visitor numbers to the colony increased dramatically from 19,088 visitors in 1987/88 to 37,885 in 1990/91 after the development and opening of the new reception centre. Additionally, the international component altered from 48.5% international visitors in 1987/88 with USA, Australia and Britain being the dominant sources to 57.3% international visitors in 1990/91 with Germany being the dominant source over these countries (Higham 1998). Predominantly, non-English speaking visitor nationalities had increased the most dramatically. This is likely to have resulted in the increasing complexity of visitor interpretation. The increased visitor numbers also created the necessity for guides to communicate appropriate visitor conduct (Higham 1998).

Further, before the construction of the viewing facility and reception centre, it was considered that the colony attracted wildlife experts or specialists who would have been displaced from the setting as a result of the increasing number of novices or generalists post-development (Higham 1998). Higham (1998) commented that novices are least likely to hold accurate expectations of the wildlife experience and evidence was provided by visitor books post-dating construction conveying the expectations of the 'new' visitors of handling Albatrosses, walking among crowds of nesting birds and the possibility of feeding birds with bags of bread. Additionally, novices are visitors who demand introductory rather than supplementary information and also require the policing of behaviour. Inappropriate noise levels, the use of camera flashes and inappropriate behaviour in the observatory are common behaviours (Higham 1998).

While the above studies provide examples of a natural area experiencing a change from specialist to generalist visitors, other studies highlight that tourists will often visit more than one destination during a trip and are more likely to be generalists (Deng et al. 2002). Tourists will typically experience a range of natural and cultural environments and in practice only a small proportion of tourists travel to exclusively experience nature or culture (Blamey & Hatch 1998; Deng et al. 2002). Specialist tourists such as botanists, ornithologists or geologists will remain a small market segment while generalist tourists that visit a natural area to sightsee, photograph, or those that visit a resort or location to visit and learn about a particular habitat or animal occupy a larger market segment. Generalists are more likely to partake in a natural area activity on at least one day during their trip away from home (Blamey & Hatch 1998; Deng et al. 2002).

The Concept of Impact Creep

Impact creep is the management response of developing a site to rectify an impact situation or address increasing visitor numbers. As previously discussed, a recreation site, tourist attraction or wildlife experience may experience increasing numbers of visitors over time. In addition to this, there may be ideas regarding the diversification or enhancement of the experience that are already present. Such trends may result in increasing levels of impact, further (new) impacts, cumulative impacts, recreational succession and displacement of specific user types (Table 2). In response to these changes there is usually a greater need for management of the site in order to accommodate higher visitation and ameliorate negative environmental and social impacts. The impact creep situation does not usually include management actions such as limiting use or site restoration such as closing or resting a site. It does however usually include an increase in visitor communication and education.

Table 2: Potential changes that can constitute impact creep

TREND	VISITOR AND MANAGEMENT RESPONSE
Visitor impacts detected	Zoning (e.g. designate recreation areas) Site hardening (e.g. sealed access ways and trails) Site design and provision of facilities (e.g. campsites, toilets, seats, picnic tables)
Increased visitation	Increasing use of natural areas and resultant site hardening may alter the character of a setting to a point where it no longer has attributes that originally attracted visitors to the area.
Changed visitor profile	Original visitors displaced by people that are more tolerant of the changed resource condition. Additional site hardening so that impacts are mitigated and site and opportunities provided are attractive to a broader spectrum of visitors.
Permanent accommodation (ecolodge/ resort)	Social, economic and political pressure to cater for increased visitation and provide business opportunities for local people and developers.

Derived from Hammitt & Cole 1998, and Manning, Lime & Hof 1996

Depending on your perspective as a visitor, manager and/or business operator the changes indicated in Table 2 can be perceived as either negative or positive or be a complex mix of both. It is important to understand the nature of such perceptions so that natural, authentic tourism experiences can be maintained, visitor satisfaction is maintained and that a range of recreation opportunities are available within any one region.

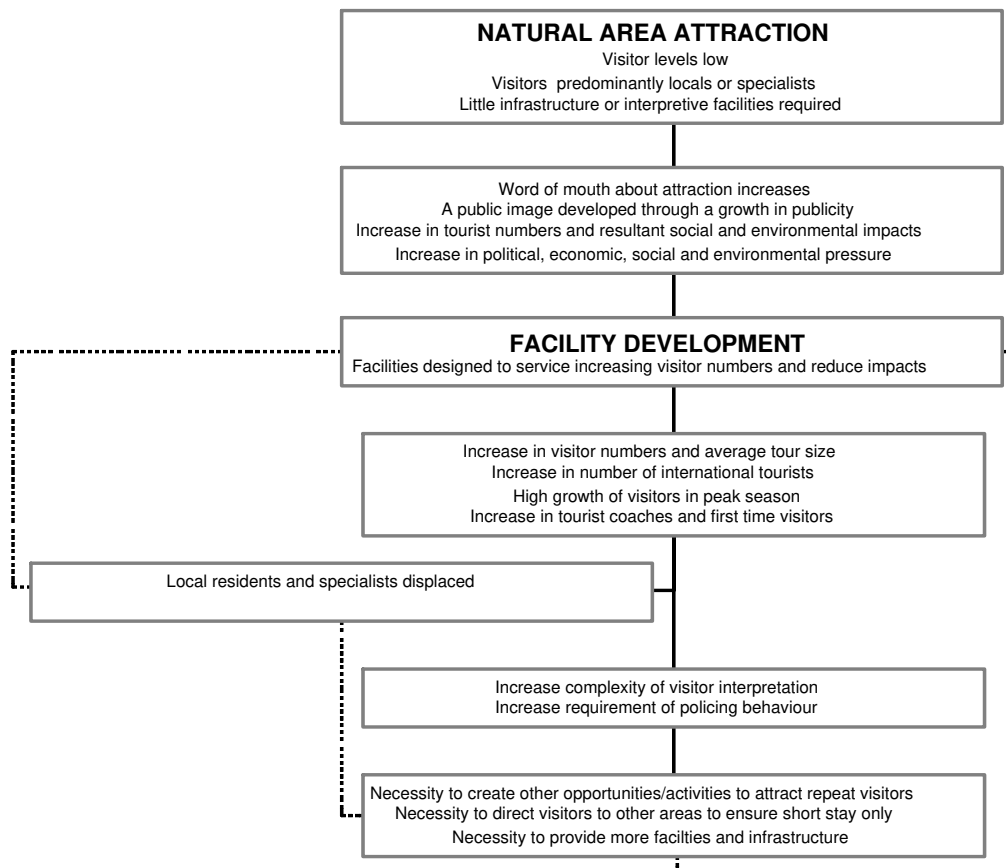
Defining Impact Creep

Impact creep can be defined as a temporal sequence of changes (e.g. increased visitation, changes in visitor profile, increased environmental impacts, site hardening, provision of facilities) that lead to a site being more developed (e.g. sealed walkways, toilets, visitor centre, shops, upgraded roads, expansion of car parking and accommodation facilities). Impact creep is often an evolving process reflecting a management response to visitor pressure and increasing environmental impacts. Impact creep is a management phenomenon of choosing development as a management response as opposed to other management actions such as restriction of access and limiting use. Additionally, impact creep often occurs with very little visitor consultation and input. Impact creep can occur even when zoning practices such as the Recreation Opportunity Spectrum (ROS) are in place. ROS is a means of identifying and determining the diversity of recreation opportunities for a natural area, based on the idea that the quality of visitors' experiences is best assured by providing diversity and helping visitors to find the settings providing the experiences they are seeking (Clark & Stankey 1979; Newsome et al. 2002). ROS uses the classes of primitive, semi-primitive, roaded natural and developed. Impact creep may start in a natural area that is zoned as primitive and even though there are guidelines for no development in this zone, as the area becomes more popular resulting in increasing environmental impacts, management respond to the situation by

hardening the site. This may evolve so that the site over time becomes gradually more developed and therefore there is a need to modify the zone type with the changes. There are also impact creep situations where a site that had very low levels of development but increasing visitor numbers may become highly developed over a short period of time to address the increasing environmental impact situation.

Impact creep can be viewed as positive where impacts are reduced and more effectively managed, visitor satisfaction is enhanced, when there is increased revenue collection and where the attraction and wider natural area gain more conservation significance. Impact creep can also provide a more convenient experience for visitors. Negative aspects of creep involve trends towards mass tourism, management having to respond to increased risk of impact and increasing visitor demands, overcrowding and reduced visitor satisfaction and where economics motivates and leads development (see Table 1). Further, impact creep may lead to a situation where there is a reduced variety of recreation settings available. Impact creep also contributes as a vector for visitor displacement and can create a situation where natural areas may become highly developed as a result of a management response of providing facilities to ameliorate impacts. In Australia, this is particularly relevant as the management action of limiting use or restricting access is infrequently applied. Impact creep may be the inevitable consequence of having to manage and mitigate impacts at busy sites that show increasing popularity over time. A central issue is the need to manage changes in the visitor profile as described by Duffus and Dearden (1990) and Higham (1998). The processes that lead to impact creep and resulting chain of events are summarised in Figure 1.

Figure 1: Theoretical framework of impact creep and subsequent development



Objectives of the Study

This project aims to explore the nature, causes, extent and public acceptance of impact creep in recreation and tourism facilities in protected areas and how it can be better managed. Two case studies were examined at highly developed sites such as the Tree Top Walk in the Valley of the Giants, Walpole, and a more detailed study of Monkey Mia, Shark Bay, Western Australia. The three key objectives of this study were:

- To define and explore the nature of impact creep.
- To understand impact creep in the context of two contrasting case studies. Subsidiary objectives relating to these case studies include:
 - to explore what processes and strategies are employed in the decision making process in

relation to site hardening.

- to determine if management actions of site hardening detract from the visitor experience.
- to determine how visitors feel about highly developed sites such as those that contain permanent accommodation facilities and infrastructure.
- To provide a management perspective on impact creep.

Chapter 2

METHODOLOGY

Overview

The following section describes two Western Australian case studies where impact creep has occurred and the methodology applied to explore the processes of impact creep. The methods applied in undertaking the before-mentioned study consisted of a literature review and development and distribution of questionnaires to visitors at Monkey Mia and an interview of managers at Monkey Mia and Tree Top Walk. The project considered impact creep relevant to both public and private facility developments.

Figure 2: Location of study sites, Monkey Mia and Tree Top Walk



Selection of Study Sites

The two study sites, Monkey Mia and Tree Top Walk in Western Australia (Figure 2), were selected as they are both tourism icon sites of Western Australia and there was a known historical context of how the sites have evolved over time. These sites have a long recreation history with evidence of increasing visitation. Monkey Mia experienced progressing development. Over time, as the popularity of Monkey Mia grew more facilities were added to the site and access was upgraded. Tree Top Walk also had increasing visitor pressure and resultant high levels of environmental impact, however, the site went from semi-primitive with a low level of facilities to a highly developed site in a short period of time. Both sites started as fairly primitive sites with few facilities and

access via gravel roads. Additionally, at Monkey Mia the road was subject to seasonal closures coinciding with rain events. These sites are now considered as sites of a highly developed nature including bitumen access roads, car parking areas that accommodate tour buses and other infrastructure such as visitor centres and souvenir shops. The main attraction at both of the sites is the natural environment, however, in the case of Tree Top Walk the walk structure has also become part of the attraction to the natural environment. At Monkey Mia, the resort development included at the site is also an important aspect of the visitor experience.

Within each site recreation use is confined to a relatively small area of the natural environment and the experience offered generally attracts day visitors. Accommodation on-site at Monkey Mia may blur this distinction. However, the dolphins at Monkey Mia come in daily and are only provisioned from 8:00am to 1:00pm each day. This means that visitors engage in other activities in the afternoons.

Management Interviews

Perceptions of managers were sought via personal interviews carried out in December 2003 and February 2004. Management staff from the Department of Conservation and Land Management (CALM) (N = 4) working in the study areas were contacted to be interviewed. Participants were staff that had a working knowledge of the study area both prior and post development (Appendix A). A detailed knowledge of the study area was required to answer the interview questions, hence the small sample size.

Interviewees were initially contacted by email which included a request to participate and background information relating to the study. Participants were then contacted via telephone to establish a time to be interviewed. Participants were forwarded further background information closer to the time of the scheduled interview which described the study, research objectives and the full set of interview questions. All those approached agreed to be interviewed.

Interviews were conducted at a location and time convenient to each interviewee and lasted approximately one hour. Interviewees' permission and signed releases were obtained for the interviews to be recorded on tape in accordance with approval from Murdoch University Ethics Committee, which was obtained prior to the commencement of interviews. The interview was recorded both in written form and by tape recorder. Notes were written down only recording key words and concepts during the interview and a more detailed summary of the interview was completed immediately after each interview. Recorded notes were transcribed at a later date.

A series of standardised questions were asked during a face-to-face interview (Appendix B). The interviews were focussed or semi structured which allowed interviewees the freedom to expand on their responses based on their individual experiences while still being structured (Frankfort-Nachmias & Nachmias 1992; Sarantankos 1993). Each interview was conducted in a conversational mode therefore the schedule of the questions was treated with some flexibility. The questions were open ended with the length and depth of response varying between questions and interviewee. Respondents were given considerable liberty in responding to questions and the interviewer who participated actively during the interview provided explanation or further expansion where required. The interviewer avoided personal bias, leading questions and suggestive questioning and conducted interviews as per informal guidelines recommended in Frankfort-Nachmias and Nachmias (1992) and Sarantankos (1993).

Monkey Mia Visitor Survey

The Monkey Mia Visitor Survey was used to establish how, and to what extent, existing recreational opportunities within Monkey Mia Reserve were being used and conducted (Appendix C). A survey of the visitors to Tree Top Walk was not conducted due to the time constraints of this project. Instead, other visitor surveys from this site will be referred to for comparison where applicable.

A sample of the population of visitors to Monkey Mia was surveyed on-site. Visitors in Monkey Mia at the time of survey were approached by the researcher and asked if they would fill out a short, 10 to 15 minute questionnaire. The survey was completed independently by visitors whilst in the Reserve and collected on-site. The study population included people 16 years and over. Sampling was conducted over the course of six days (29 November to 5 December 2003) between 8.00am and 1.00pm, stratified by weekdays and weekends. This time frame was chosen as this is the peak period for visitation. A trial determined that many of the visitors at Monkey Mia after 1pm had already been approached by surveyors in the morning during the dolphin interaction. Visitors at Monkey Mia after 1pm were generally guests staying at the resort.

A written questionnaire was chosen to survey visitors rather than interviews because of the lower costs involved and to avoid personal influence and bias. Further, it was desirable that anonymity was maintained (Frankfort-Nachmias & Nachmias 1992). A combination of open- and closed-ended questions were included. Additionally, ranking was used so that the degree of importance relating to certain conditions could be obtained (Frankfort-Nachmias & Nachmias 1992). Leading or threatening questions were avoided.

On-site surveys were considered preferable due to an interest in accurate recall. The on-site survey approach had a high response rate (95%) therefore confidence is assured that a broad sample population of users were surveyed. Using a confidence level of 95% with a population of 936 a confidence interval of 6.01 was obtained.

The visitor survey was organised into five parts: Part I – most recent visit characteristics, Part II – reasons for

visiting Monkey Mia, Part III – visitors’ perceptions and attitudes toward the existing environmental (biophysical and social) conditions, Part IV – management preferences, and Part V – visitor characteristics (Appendix C). Questions in the survey addressed visit and visitor characteristics, visitor perceptions of current conditions, their acceptability of recreation impacts on conditions and attitudes towards potential management actions to minimise impacts.

In the following chapters, a description of each of the study sites is given. This includes the location; climate; topography; geology and soils; flora and fauna of special interest; historical recreation use of the site; recreation opportunities and facilities and current recreation use and management of the site.

Chapter 3

CASE STUDY 1: MONKEY MIA RESERVE

The following chapter provides a site description and highlights the process of impact creep and the consequential development of Monkey Mia in response to increasing visitor numbers and includes, where relevant, responses from the management interviews. The section discussing current recreation use and management describes visitor data that shows the gradual increase in visitor numbers. This is then followed by results and discussion from the visitor survey conducted for this study.

Monkey Mia Reserve is located on the eastern shore of the Peron Peninsula, 25 km east of Denham in the Shark Bay World Heritage Area, Western Australia (Figure 2). The Reserve has high conservation and economic values for the region and is one of the major attractions for visitors to Shark Bay (CALM 1993). Monkey Mia is renowned for the bottlenose dolphins (*Tursiops truncatus*) that have been entering the shallows of the bay since the 1960s to interact with people on the beach and also to take fish from humans (CALM 1993). While the dolphins of Monkey Mia provide a focus for tourism in Shark Bay, they remain only a small part of the total spectrum of recreational opportunities in the region. Monkey Mia Reserve is also an important habitat for the thick-billed grasswren (*Amytornis textilis*) (declared as priority taxa under CALM's threatened fauna database) and in the adjacent waters the dugong (*Dugong dugon*) which is declared under the *Wildlife Conservation Act 1950* to be in need of special protection (CALM 1993; Government Gazette 2003).

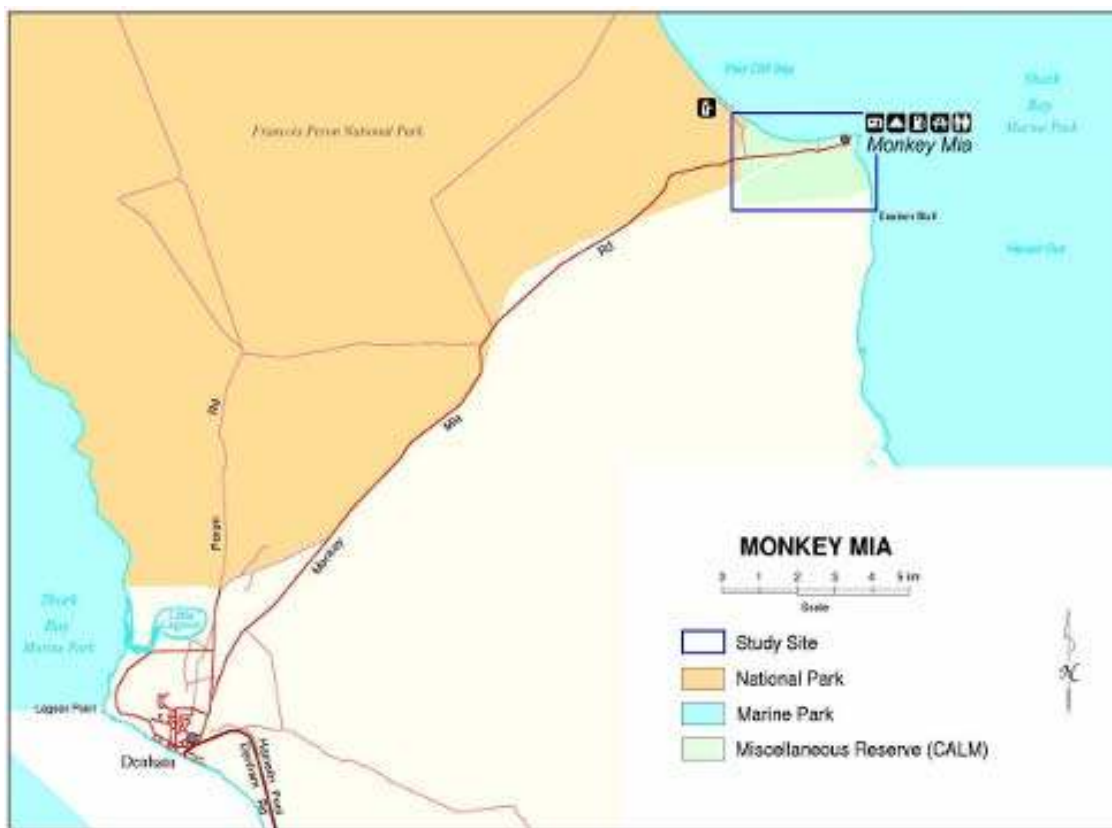
Monkey Mia Reserve is in the Carnarvon Botanical District containing four landform units – white coastal dunes, coastal sandplain, red sandplain and salt pans or birridas. The red sandplain is the dominant landform of the Reserve, comprising approximately 80% of the land area (CALM 1993). The vegetation is dominated by *Acacia ramulosa*. A variety of shrubs and climbers are also found in this area and are detailed in Appendix D. There are no declared rare flora on the Reserve, nor species on CALM's priority flora list (CALM 1993).

Monkey Mia Reserve covers an area of 477 ha adjoining Shark Bay Marine Park at the high water mark. The Reserve consists of three C Class¹ Reserves that are collectively known as Monkey Mia. The main part of the Reserve is managed with the purpose of 'recreation', 3.75 ha is vested in the Shire of Shark Bay for the purpose of 'caravan park, chalets and camping', this is the land that the Monkey Mia Resort and its facilities are located upon. The final reserve is an unvested C Class Reserve of 0.4 ha that contains an historic gravesite (CALM 1993). The Reserve was jointly vested in the Executive Director, Department of Conservation and Land Management (CALM) and the Shire of Shark Bay in 1988 to recognise its recreational and environmental values (CALM 1993).

The Reserve is currently managed according to the Monkey Mia Reserve Draft Management Plan 1993 with access via the sealed Monkey Mia Road (CALM 1993) (Figure 3). The Midwest Region of CALM are responsible for the design of facilities, planning of recreation sites, the well-being of the dolphins (feeding and interaction policies), conserving natural values, and the preparation of interpretation and information material. The Shire of Shark Bay are responsible for maintenance of infrastructure such as buildings, plant, assets and equipment, administration and accounting and the day-to-day administration of commercial operations including direction and management of staff associated with these operations (CALM 1993).

¹ C Class Reserve: land that may be revoked or altered by the minister (Bates 1995).

Figure 3: Monkey Mia showing Denham, Monkey Mia Road, Shark Bay Marine Park and Francois Peron National Park



Shark Bay has a semi-arid to arid climate, experiencing hot, dry summers and mild winters. Average summer temperatures range from 20°C to 35°C and average winter temperatures range from 10°C to 20°C (CALM 1993, 2000a). The average annual rainfall is low (200 mm) with most rain falling between May and July. The area is influenced by southerly winds for most of the year, with summer winds commonly blowing for several days at 25 km/hr. Periodic summer/autumn cyclones are infrequent, however winds of 70 km/hr to 110 km/hr can be generated, with gusts up to 180 km/hr (CALM 1993, 2000a).

Unconsolidated red dunes composed of quartz sand overlaying the Peron Sandstone dominate the Reserve. This adjoins white quartz sand dunes forming a strip between the red dunes and the beach (CALM 1993). A section known as Red Bluff is where the red dunes meet the coast directly forming a short steep cliff. The Peron Sandstone breaks through the overlaying sands in several areas in the Reserve with the most noticeable being in the small caves close to Monkey Mia. The soils at Monkey Mia are prone to erosion. The area has a maximum elevation of approximately 30 m above sea level and is generally undulating (CALM 1993).

Historical Recreation Use and Development of Monkey Mia

It is estimated that Aboriginal people (the Mulgana people) occupied Monkey Mia at least 1,000 years ago according to the archaeological test excavations and dating in 1986 of two rock shelters located in the Reserve (Bowdler 1995) (Figure 4). The presence of five Aboriginal sites has been identified in the Monkey Mia Reserve that include rock shelters, midden sites, quarries and artefact scatters. These sites are located very close to the shoreline and animal skeletal remains indicate that the Mulgana people lived predominantly near the sea. While there is evidence that some land animals may have been exploited, the main food source was of a marine origin such as crabs and shellfish with the exploitation of dugongs and turtles being a relatively recent phenomenon, falling within the last 1,000 years (Bowdler 1995).

Shark Bay has a long standing non-Aboriginal history containing the site where Dirk Hartog erected his plate recording the first known visit of a European to Western Australian soil on 25 October 1616 (CALM 2000a; Shire of Shark Bay 1998). In 1890 Monkey Mia was settled by pearlmen and given its name. The Reserve was originally gazetted in 1890 for the purpose of 'Government Requirement', following a request by a pearler for land to depasture sheep. Monkey Mia was used as a base for the pearling and fishing industries, which at the time had a population of 135 (Figure 4) (CALM 1993).

Figure 4: Timeline of development, tenure and recreation use at Monkey Mia

1000s	Evidence of Aboriginal occupation (Mulgana people) at Monkey Mia
1890s	Fishing and pearling industries established (population of 135)
1960s	Dolphins entering the shallows of the bay
1975	Caravan park established
1985	Denham-Hamelin Road sealed Information Centre constructed
1986	Car park, entrance tollbooth, barbecues, boat ramp established
1988	Denham-Monkey Mia Road sealed, car park re-developed, toilets installed and landscaping implemented Joint vesting of Monkey Mia Reserve with CALM and Shire of Shark Bay
1989	Caravan park re-developed and upgraded, Monkey Mia Resort built
1990	Waters adjoining Monkey Mia Reserve declared Marine Park
1991	Shark Bay listed as World Heritage Area. Shark Bay Airport built
2001	Monkey Mia Visitor Centre officially opened
2003	Monkey Mia Resort expanded to include backpacker accommodation

In the 1960s, local fishers began feeding bottlenose dolphins at Monkey Mia in the shallows of the bay when they returned with their catch. At least 11 adult dolphins (no more than seven adults at any one time) have visited Monkey Mia to accept fish hand-outs and touching from fishers and tourists standing in knee-deep water (Mann & Kemps 2003). The occurrence of this interaction travelled by word of mouth resulting in an increasing number of visitors coming to see the dolphins. Monkey Mia became a popular destination to see dolphins, fish, swim and for boating. This attraction led to a caravan park being established in 1975 (CALM 1993). Visitation at this time was still relatively low, approximately 10,000 people, due to difficult access, lack of facilities and a lack of public awareness of its attractions (CALM 1993) (see Figure 4).

There was a slow increase in the number of visitors to Monkey Mia until the mid 1980's. In 1985 the Denham-Hamelin Road was sealed bringing more visitors to the Shark Bay region (CALM 1993). At this time, an information centre was constructed at Monkey Mia and in 1986 a boat ramp, entrance tollbooth and barbecues were established (Figures 4 and 5). Once these facilities were established visitors were charged entrance fees to recoup ongoing staff and maintenance costs.

Figure 5: Monkey Mia prior to development of resort (1987) and sealing of Denham-Monkey Mia Road including dolphin interaction area, visitor centre and caravan park

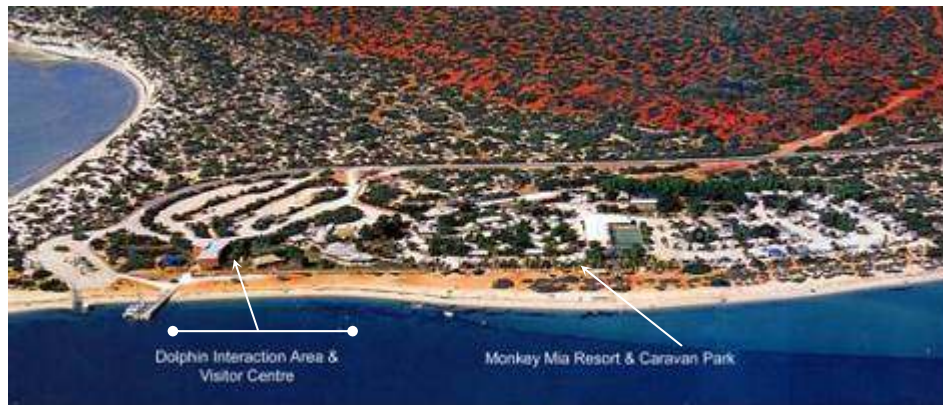


Source: Raffaele (2003)

In 1988 a State Government grant provided monies for the Denham-Monkey Mia Road to be sealed, car parks and toilets to be developed and for landscaping (CALM 1993) (Figure 4). At this time, with improved access, public awareness of dolphins interacting with people at Monkey Mia increased, bringing an influx of visitors to Monkey Mia over a short period of time. As a response to the increase in visitors to Monkey Mia, the caravan park was redeveloped and upgraded in 1989/90 (CALM 1993). This redevelopment included the construction of the Monkey Mia Resort (Figures 5 and 6). Additionally, in 1991 the Shark Bay airstrip and

airport was built, further improving access to Shark Bay (Figure 4).

Figure 6: Monkey Mia redevelopment and sealing of Denham-Monkey Mia Road including dolphin interaction area, new visitor centre and Monkey Mia Resort and caravan park



Source: Raffaele (2003)

Interviewees stated that there were a number of social and environmental impacts present prior to the development of the Monkey Mia Resort in 1989. As shown in Figures 5 and 7, the caravan park permitted patrons to drive 4WD vehicles onto the beach and set up camp. Camping was also allowed on the beach east of the jetty near areas used by wading birds that resulted in disturbance to these species. 4WD vehicles were unrestricted and drove up and down the beach. As a result there were multiple access tracks throughout the sand dunes and leading to the beach. The Draft Management Plan also stated that uncontrolled camping and vehicle access caused a maze of unnecessary tracks, especially near the coast, that caused erosion and degraded vegetation (CALM 1993). Further, camping had caused associated problems with littering, hygiene and firewood collection. Also of concern was undefined walk tracks, particularly on the red sand dunes south west of the caravan park that were also causing erosion. The vegetation at Monkey Mia is easily damaged and soils are susceptible to erosion (CALM 1993).

Figure 7: Dolphin interaction at Monkey Mia in 1987/88 prior to development of the resort



Source: Edwards (1987)

Interviewees stated that the existing caravan park (prior to redevelopment) did not have enough toilets to accommodate the number of visitors as visitor pressure increased and that the septic systems were located too close to the beach. The Environmental Protection Authority (EPA) undertook an investigation in 1989 as a result of the death of a six week old dolphin calf (Koorda calf of Holey Fin) at Monkey Mia in January 1989, which was closely followed over the next 18 days, by the absence of the two remaining calves, three adult males and a juvenile from the 'regular' group of dolphins that visit Monkey Mia, a total of seven dolphins (EPA 1989). The calves were assumed to have died because they were still nursing from their mothers at the time of their disappearance and the adults presumed dead because they were never seen again by researchers involved in ongoing monitoring (Wilson 1994).

The disappearance of these dolphins represented a drastic departure from the beach feeding dolphins' normal behaviour during this time, while the behaviour and health of offshore dolphin populations seemed unchanged. The report suggested that considerable amounts of sewage were leaching into the marine environment that was likely to be coming from the septic systems from the Monkey Mia caravan park and the information centre and therefore the obvious source of contamination, however, a causal link to the death and disappearance of the dolphins was not implied (EPA 1989). At the time these toilet facilities operated on septic systems involving holding tanks for solid wastes connected to leach drains to take the liquid overflow. The information centre toilets were located 30 m from the high water mark with the leach drain located about 15 to 20 m from the high

water mark, while the caravan park toilets were located about 45 m from the high water mark. It was considered that these facilities were inadequate to cope with peak demand (EPA 1989).

Prior to redevelopment, no official monitoring of the biophysical environment occurred with exception to water quality samples taken by EPA in 1989 (EPA 1989). Information relating to impacts was based on personal observation from CALM staff and reported in the draft management plan (CALM 1993). A visitor survey was conducted by the Western Australian Tourism Commission (WATC) in the Shark Bay region in 1988 and is discussed in detail in the section addressing current recreation use. In this survey, which pre-dated the redevelopment of Monkey Mia and the sealing of Monkey Mia Road (Figure 4), 26% and 21% (N = 70) respectively stated that 'the area should remain as it is and not become too commercialised' and that 'the Monkey Mia Road should be sealed' (WATC 1988).

Prior to the redevelopment of the caravan park in 1989, interviewees stated that there were proposals in the 1980s for more infrastructures to be included at Monkey Mia. Some of the initial proposals were not considered. The caravan park proprietor submitted a proposal in the mid 1980's to have the size of the caravan park lease extended. This had to go through a formal review process and CALM was asked to provide their viewpoint.

CALM assessed the Monkey Mia site to determine its capabilities for redevelopment and a report was prepared. Interviewees stated that prior to redevelopment the caravan park was not well planned, the facilities and amenities were out dated and in poor condition. The existing facilities were considered sub-standard. Interviewees stated that the report identified a number of issues. It was considered that there were visitor management issues, particularly relating to dolphin interaction. Monkey Mia also needed to be maintained to provide access for commercial fishing vessels. Further the existing accommodation was considered and the question was raised 'What was or really should be the primary focus of Monkey Mia?' In trying to answer this question, CALM considered factors such as increasing visitor numbers, the existing environmental impacts, state coastal development plans and landform. Also taken into consideration was the proposed location of the development in terms of potential natural disasters such as cyclones and the effect that such disaster could potentially have on the development. Coastal engineers offered advice and suggested that if a cyclone coincided with high tide there could be a surge of water that would potentially threaten the site. In light of the issues determined in the report, three options for development were identified. Interviewees stated that the CALM preferred option was to re-locate the accommodation to Denham and to redevelop the existing site at Monkey Mia as an interpretive visitor experience, including a visitor centre, while still allowing for commercial and recreational fishing. It was felt that accommodation would be better handled in town where existing infrastructure was already in place.

The local community were also involved in the redevelopment process for the upgrade of facilities at Monkey Mia. Interviewees stated that there was a lot of debate in the community at the time about what should happen at Monkey Mia. Public meetings were held in 1988 and the local community voiced opposition to the redevelopment of Monkey Mia. Locals felt that Denham was being changed by 'outsiders' and much of the blame for this change was due to the dramatic increase in tourism as a result of Monkey Mia's dolphins and the sealing of the Denham-Hamelin Road (Raffaele 1989). The caravan park at Monkey Mia served a couple of purposes. In the mid 1980s it was a centre for commercial fishing vessels as it was and still is the only area where deep water and a jetty are available on the eastern side of the peninsula. Over time it had also become an important area for recreation. It was also realised however that there were environmental consequences of leaving the site as it was.

Interviewees stated that other inputs were also provided in the review process with the private sector and local government perceiving that there was a financial benefit to be gained in redeveloping Monkey Mia. Monkey Mia was seen as a draw card due to the wildlife/human interaction that was occurring. It was felt that the site had the potential to be a high quality facility with a good investment return.

The government decided to retain the accommodation and the lease extension was given to increase the capacity of the caravan park and included development of the resort. Once the approval was secured to increase the size of the caravan park the lease was on-sold to the current owner (Monkey Mia Dolphin Resort Pty Ltd). Recently the Yadgalah Aboriginal Corporation of Shark Bay (WA) in joint venture with Indigenous Business Australia purchased a 50% equity stake in the Resort (DOLA 2002). The current caravan park and resort facilities are twice the size of the original development (Figure 6). The resort can accommodate approximately 600 people at present (Bowman Bishaw Gorham 2004). Further development occurred in 2003 with the construction of beachside units and backpackers accommodating a further 110 people (Figure 8). More recently, documentation has been in preparation with the Department of Land Administration (DOLA) and Environmental Protection Agency (EPA) to extend the current four hectare lease to include a further seven hectares for development of an upgraded resort that will include: motel suites, family bungalows, park homes, budget accommodation, park homes, caravan park, additional tennis court and a 7,000 m² swimming pool (Bowman Bishaw Gorham 2004; DOLA 2002). Additionally, a further 2.3 ha is to be established west of the resort for new staff accommodation (Bowman Bishaw Gorham 2004). The proposed expansion of the resort will allow for an increase in capacity in order to accommodate up to 1,200 people (Bowman Bishaw Gorham 2004).

Figure 8: Monkey Mia Dolphin Lodge and backpacker units developed in 2003



Photo: A. Smith

The current level of development was driven due to a combination of factors. There was the pressure of increasing visitor numbers with tour coaches becoming a regular feature. Further there were environmental concerns as highlighted above and political and economic considerations. The present level of development was a sliding scale of events as visitor pressure increased. The situation was reactive rather than proactive.

Figure 9: Monkey Mia Dolphin Information Centre in 1987



Source: (Edwards 1987)

In addition to redevelopment of the caravan park the visitor centre was also upgraded. The original information centre (Dolphin Information Centre) was constructed in 1985 and was not well placed (Figure 9). Interviewees stated that it was placed on the beach and occasionally at high tide water would lap at the doors. There was only a very small display room with the main focus being on dolphins. There was local community support for development of a new visitor centre. Funds were secured to develop and in June 2001 the Monkey Mia Visitor Centre was completed to provide a focal point for visitors so that more could be learnt about the dolphins and other marine wildlife (Figures 10 and 11). The development included a 200-seat amphitheatre with shade cloth sails, a fish preparation room for CALM staff to prepare the food for the dolphin provisioning and 'DolphinCam', a web cam that captures images of the foreshore and made available for viewing at CALM's NatureBase website (Figures 10 and 11). The facility houses static and interactive displays, incorporating colourful and evocative graphical images used to capture the interest and imagination of visitors (CALM 2003c) (Figure 11).

Figure 10: Monkey Mia Visitor Centre and Resort in 2003



Photo: A. Smith

Figure 11: Monkey Mia Visitor Centre 2003 – amphitheatre, fish prep room + static & interactive displays



Photos: A. Smith

With increasing popularity of visitors coming to Monkey Mia to interact with dolphins it was realised in the mid 1990s that there was a necessity to put in place management practices to deal with the issues involving dolphin interaction. While this is not an action that includes infrastructure it highlights the main activity and associated impact at Monkey Mia. Monkey Mia has the reputation of being the only reported case of dolphins regularly interacting with humans over a long period of time (Orams 1994, 1995, 1997). Surveys conducted from 1989 to 1994 indicated that approximately 2,700 to 3,000 bottlenose dolphins occur within Shark Bay Marine Park (Marsh 1994; Preen, Marsh, Lawler, Prince & Shepherd 1997). Of those, a small group of dolphins come to the shore of Monkey Mia. Five to eight dolphins are considered as ‘regular’ visitors to the shore, with about another 20 being infrequent visitors (CALM 1993). The ‘regular’ dolphins visit the beach at Monkey Mia on most days, although dolphin visits vary with season, tides, natural social activities and are reduced in summer during the breeding season (CALM 1993). Currently four adult females, Nicky (29 years) (Figure 12), Surprise (24 years), Puck (28 years) and Piccolo (12 years) are provisioned. Their calves Yadgalah (two years), Burda (two years), India (seven months) and Eden (one year) respectively also come inshore but are not provisioned. Kiya (seven years) and Shock (10 years) are also non-provisioned adult females that regularly come in to shore. Piccolo was introduced to the provisioning program at the age of 10 in October 2002 (Samuels, Charles & Flaherty 2003). The reasoning behind this is that by 10 years, female dolphins have established their social and hunting skills, their survival skills are well developed and it is considered that there will be little adverse effect to their natural behaviour and health if introduced to the feeds (Samuels et al. 2003).

Figure 12: (a) Nicky, provisioned dolphin; (b) Nicky and Yadgalah in dolphin interaction area



Photos: A. Smith (2004)

As mentioned previously, in the 1960s fishers fed dolphins by hand from their catch. Monkey Mia is the only area where a significant long-term relationship between a group of dolphins and humans has developed (Orams 1994). Hand feeding continued throughout the 1970s with fishers typically feeding fresh fish and some tourists feeding frozen bait fish to dolphins (Mann & Kemps 2003). Visitation to Monkey Mia was largely seasonal (March to August) due to cooler temperatures and calm waters (Mann & Kemps 2003). In 1981 frozen fish from Perth was defrosted and sold to the public, which caused a significant change to the feeding pattern due to a constant supply of fish year round (CALM 1993). Management of visitor interaction was initially undertaken by the proprietors of the caravan park (1975 to 1985). In 1986, Denham Shire Rangers were stationed in the area (Orams 1994, 1997). The feeding situation remained the same until 1987 when freshly caught local fish were substituted for frozen fish (CALM 1993). With increasing visitor numbers there was constant pressure from visitors for more fish to be provided to allow the opportunity to feed the dolphins resulting in increased amounts being offered to dolphins. This raised concerns over possible dependency and nutritional deficiencies with dolphins receiving up to five kg per day, their total daily requirement (CALM 1993). A total of 35 kg of fish per day was being used. This practice was reviewed and in September 1987 the total fish allowance was reduced to 21 kg to 28 kg per day and was further reduced in June 1988 to 15 kg per day (CALM 1993).

In December 1988 the Dolphin Interaction Area was gazetted, which closes the water to navigation by all craft and swimming is not permitted in order to protect the dolphins from injury and to minimise disturbance to

visitors in the interaction area (CALM 1993). The Dolphin Interaction Area is an area that extends approximately 45 metres offshore from the high tide mark and 90 metres west of the jetty. This area is marked with the use of buoys.

In February 1989 the sale of fish ceased and Shire rangers regulated the feeding of the 'regular' dolphins with visitors being selected by rangers to give designated dolphins fish. Feeding from boats was discouraged. The fish allowance was further reduced to two kg per day for each provisioned dolphin, which is based on providing one third of the dolphins average daily consumption (CALM 1993). Denham Shire rangers managed the interaction from 1986 until 1996 when CALM took over management of the interaction and supply of fish.

A further concern of feeding dolphins is the significant risks for calves born to provisioned dolphins. Historically, provisioned female dolphins were found to have significantly lower calf survivorship than wild-feeding females in Monkey Mia (Bejder & Samuels 2003; Mann, Connor, Barre & Heithaus 2000; Mann & Kemps 2003). A comparison between provisioned and non-provisioned mothers and their offspring between 1985 and 1993 showed that calf survival was 36% for provisioned dolphins and 67% for non-provisioned dolphins (Wilson 1994). An example of calf mortality of a provisioned dolphin was the death of Hobbit, calf of Holeyfin. Hobbit was killed by a tiger shark near the jetty while Holeyfin was being fed fish from tourists about 70 metres away (Mann & Kemps 2003). Holeyfin subsequently defended Hobbit's carcass from the tiger shark, suggesting she might have prevented the death had she not been pre-occupied (Mann & Kemps 2003).

As a result of high calf mortality and concerns over dolphin health, Wilson (1994) reviewed dolphin management at Monkey Mia and recommended a range of measures so that management strategies ensured the sustainability of the dolphin-human interaction. Significant changes to feeding strategies and overall management were recommended. These changes were implemented in 1995 and included (CALM 1996; Mann & Kemps 2003; Wilson 1994):

- Eliminating or markedly reducing unregulated feeding (e.g. from boats).
- Restricting dolphins to a maximum of three feeds per day. Feeding times vary between 8am and 1pm (this encourages dolphins to spend afternoons offshore, socialising and foraging for wild food). Feeding times are variable and dependent on when the dolphins come in-shore.
- Only adult female dolphins are provisioned.
- Juvenile dolphins are not provisioned (up to four years old). At the age of 10, daughters of provisioned female dolphins may be considered for introduction into the feeding programme. This was the case with Piccolo in 2002.
- Male dolphins are not provisioned. This reduces the incidence of aggressive acts such as biting people during feeding or aggression to other dolphins that may occur with male dolphins, as reported in other locations by Orams (1997). Also, sons infrequently associate with their mothers post-weaning.
- Restricting provisioned adult females to a maximum of 2 kg of fish per day, rather than averaging daily amounts over the entire month as done previously.
- No touching of dolphins permitted.
- Visitor information is given during the dolphin interaction. Rangers impart information over a PA system broadcast at the beach during the interaction about dolphin biology, behaviour, the feeding regime and information to prevent inappropriate dolphin interactions. They also provide information about other activities and attractions in the Shark Bay region.
- Changes to feeding regime included: In preparation for feeding, rangers ask visitors to move out of the water; buckets are then brought down to the water and each ranger takes a bucket to a specific female. The feeding begins with rangers selecting one person at a time and asking them to approach each bucket. The ranger hands each person a fish and they feed it to the dolphin head-first. After they have given the fish to the dolphin, they are asked to leave the water immediately so the next person can be called. The last fish is offered to each dolphin simultaneously to avoid competition over buckets. After the final fish is offered, the buckets are tipped over and dipped in the water to show the dolphins that the feed is over. The entire feeding regime usually takes three to five minutes. The dolphins almost always leave the dolphin interaction area within five minutes after the feed.
- Pelicans are fed on the beach at the same time as the dolphins to reduce the incidence of pelicans competing with dolphins for provisioned fish.

As mentioned above, prior to changes in feeding practices, 92% (11 of 12) of nursing calves born to provisioned dolphins died between 1987 and 1994 (Mann et al. 2000; Mann & Kemps 2003). Since these changes to feeding have been implemented there has been a decrease in calf mortality to provisioned dolphins. In the seven years since the restrictions were in place, no nursing calves have died and all six have survived to weaning (Mann & Kemps 2003). Mann and Kemps (2003) suggested that the primary cause of the high calf mortality of provisioned dolphins was due to poor maternal care (neglect). The changes to feeding has been successful because it reduces the amount of time that mothers and calves spend in the provisioning area (from 2.7 to 2.8 visits per day in 1991 to 1994, to 2.0 to 2.2 in 1995 to 1999), thus reducing the amount of time that calves were neglected.

Recreation Opportunities and Facilities

Visitor use at Monkey Mia is concentrated in a relatively small area. Five areas provide for varying levels of use which include: commercial activities area, beach mooring area (for overnight visitors), Dolphin Interaction Area, beach mooring area (for professional fishermen, commercial operators and day visitors), and a no beach mooring area (for recreational beach fishing) (Figure 13).

Figure 13: Monkey Mia Resort & Visitor Centre, facilities and Dolphin Interaction Area



Adapted from CALM 1993

There is a diverse array of facilities offered to the visitor, managed by both CALM and the Monkey Mia Resort. CALM managed facilities include the Monkey Mia Visitor Centre and souvenir shop, tollbooth, 200-seat amphitheatre with shade cloth sails, video auditorium, beach shelters, Monkey Mia walk trail, fish preparation room and a beach office for CALM staff. These facilities are staffed from 7.30am to 6.00pm every day.

A fee is charged for entry to Monkey Mia and all visitors are charged this daily fee upon entry to the Monkey Mia Reserve. The fee structure is as show in Table 3. Interviewees stated that CALM charge entry fees to cover costs. As discussed previously, these fees help cover the costs of providing management on the beach, adjacent waters and visitor centre. CALM also empty bins and collect litter on the beach.

Table 3: Entry fee structure (as at 29/11/03)

VISITOR	DAY PASS	TERM PASS (4 WEEKS)
Family	\$12	\$22
Adult	\$6	\$9
Child (6-16 years)	\$2	\$4
Child under 6 years	\$0	\$0

The Monkey Mia Dolphin Resort offers a variety of accommodation and facilities. Facilities located in the area vested in the Shire of Shark Bay and set aside as caravan park, camping and chalet includes: swimming pool, hot tub, two tennis courts, beach volleyball, barbecues (gas), lawn area near beach, kayak and glass bottom boat hire, scuba dive hire, Boughshed Restaurant and the Peron Café. Other facilities include function room for weddings and presentations, Masseuse, internet café, one hour photo lab, Mini Mart and guest laundry. Accommodation includes: camping in powered tent and caravan sites, on-site caravans, backpackers, Dolphin Lodge beachside units, family park homes and luxury motel style beachfront and garden villas. As discussed previously, these facilities have developed over time in response to environmental, political and financial pressures.

Alternatives to the beach dolphins, activities are offered by a number of commercial operators. These operators give the opportunities for visitors to view other marine wildlife. The vessels (Shotover and Aristocat2) offer a variety of tours and currently take passengers to different sites to minimise congestion. Additionally, Monkey Mia Pearl operates tours to the pearl lease (The Blue Lagoon Pearl Farm) west of Monkey Mia. The trip is a 20-minute boat trip from Monkey Mia. The pearl farm offers a pontoon experience learning about seeding, cultivating and harvesting pearls.

As a result of increasing visitor numbers in the Shark Bay region a number of other sites within Shark Bay have been upgraded. These initiatives have been implemented by CALM and the Shire of Shark Bay and include the development of roads, car parks and other structures for tourism. Interviewees stated that the areas that have been upgraded as a result of increasing tourism use include: Hamelin Pool, Nanga Station, Peron Homestead, Skipjack Point, Eagle Bluff and the Denham town site.

Hamelin Pool Marine Nature Reserve was gazetted in 1990 and a small area adjacent to the reserve was developed in the mid 1990s (CALM 1996). Included in the development were a boardwalk, car park and interpretive displays (Figure 14). Additionally, in land adjacent to the visitor site is Hamelin Station. A caravan park was developed that includes a 20-bay caravan park with on-site vans available, barbecues and picnic area, powered sites, bitumen access road, tearoom and souvenir shop, and museum that was formerly the Hamelin Pool telegraph station. The land on which the caravan park was developed was previously part of the Hamelin Station and informal campgrounds.

Figure 14: Hamelin Pool interpretive displays and boardwalks at stromatolites



Photos: A. Smith

Other areas that have been developed that were formerly stations in the Shark Bay region include Nanga Station and Peron Homestead (in Francois Peron National Park, formerly Peron Station). Nanga Station has resort style accommodation including motel rooms, cabins and caravan sites. It also has a restaurant, bottle shop, mini supermarket, hot artesian spa, tennis court, swimming pool and boat ramp. CALM purchased Peron Station in 1990 and was gazetted in 1993 as Francois Peron National Park (CALM 2000a; McKenna 2004). Peron Homestead is located in Francois Peron National Park. In 1997/98 a new artesian bore hot tub, picnic grounds, gas barbecues, heritage walk trail and visitor centre were developed and in 2000 a car park was built (Figure 15) (CALM 2000a). Interviewees stated that there is a proposal to improve the road to the homestead to allow better 2WD access, with the remainder of the Park remaining 4WD access only. Additionally, of significance to tourism is the proposal to exhibit fauna at the homestead precinct in the form of a nocturnal animal viewing enclosure to provide opportunities for visitors to experience threatened species bred for reintroduction to protected locations (CALM 2000a).

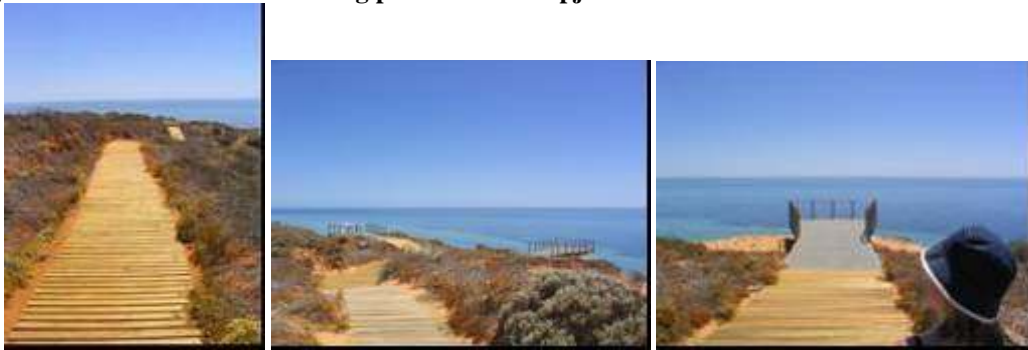
Figure 15: Peron Homestead in Francois Peron National Park including visitor centre and artesian bore hot tub



Photos: A. Smith

Within Francois Peron National Park other areas have been developed. Skipjack Point near Cape Peron has been upgraded to include a car park area, boardwalks, viewing platforms to view the sea, coastline and marine-life (Figure 16). There are future plans to re-align the track up to Skipjack Point but access will remain as 4WD only.

Figure 16: Boardwalks and viewing platforms at Skipjack Point in Francois Peron National Park



Photos: A. Smith

Shell Beach Conservation Park is one of the regions most visited features with 135,000 visitors recorded in 1997/98. The Park is generally a day use site only. In 1994, works were undertaken to rehabilitate the main beach which had become crushed and compacted from vehicle traffic (CALM 2000a). Fencing was installed to prevent vehicle access on the main beach area and recreation facilities such as toilets, seating, paths, car parking area and interpretive signs were upgraded (CALM 2000a).

On the west coast of Peron Peninsula a popular lookout site, Eagle Bluff, which is located on CALM lands was upgraded in 2000. Eagle Bluff provides views of the sea, coastline and marine-life. The area is easily eroded and was rapidly being damaged by large number of visitors. Funding was allocated to construct timber boardwalks, interpretive displays and two lookouts in the area as well as toilets and car parks (Figure 17).

Figure 17: Boardwalks, viewing platforms and car parking area at Eagle Bluff



Photos: A. Smith

Denham town site has also had an increase in development since the sealing of the Denham-Hamelin Road in 1985 and development of the resort at Monkey Mia in 1998. In 1988, the population of Shark Bay was approximately 400, and in 2003 the population was approximately 984 (Raffaele 1989, 2003; Shire of Shark Bay 2003). In 1988, Denham had only a small pub and a few shops. In recent years, there has been an increase in

accommodation, shops, there is a resort style hotel on the water front and the foreshore has been developed to include barbecues, a grassed area and a playground.

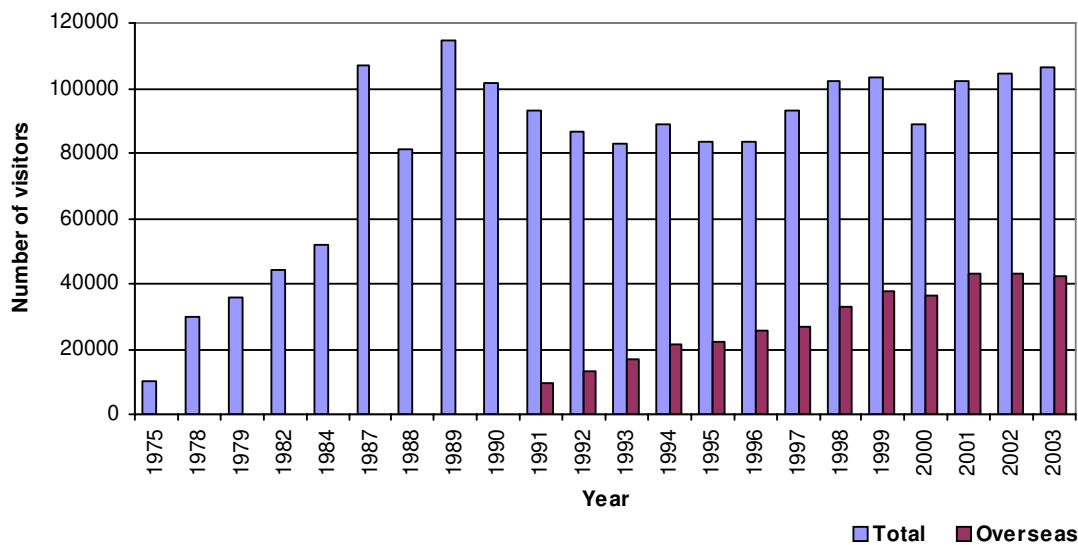
These additional developments show that impact creep, the resultant management responses and eventual increase in visitation have further reaching consequences for the region. Visitors may expect other sites in the region to have similar levels of development. Additional development may be seen as an advantage for the region as visitors may extend their stay and therefore a higher financial contribution to the region is obtained. However, some visitors who sought a more primitive experience may be displaced.

Current Recreation Use and Management

As discussed previously and shown in Figure 1, increasing visitor numbers can have a profound effect on a natural area and this in turn influences management decisions. As highlighted previously, it was decided to develop the site at Monkey Mia over applying other management regimes such as limiting use and restricting access. Interviewees stated that visitors to Monkey Mia have typically been generalists over specialists. As mentioned in the previous section, dolphin feeding was historically incidental with people mainly coming to Monkey Mia to fish and launch boats. Only in recent years has the focus of visitation been on the dolphins. Interviewees stated that this is due to marketing and word of mouth.

Actual visitor numbers before 1987 are not available, however, estimates have been made using other road and tourism surveys. International visitor numbers are available from 1991. Since 1977 visitor numbers per annum have ranged from 10,000 to 114,335 (Figure 18). The sharp increase in visitation from 1984 to 1987 is due to access to the Shark Bay Region being more accessible with the sealing of Denham-Hamelin Road. The highest visitation at Monkey Mia was in 1989, which coincides with the sealing of Denham-Monkey Mia Road and the opening of Monkey Mia Resort and facilities as discussed in the previous section. Since 1998, visitor numbers have stabilised with the mean visitor numbers per annum being 101,170 (Figure 18).

Figure 18: Annual visits to Monkey Mia Reserve (1975 to 2003)

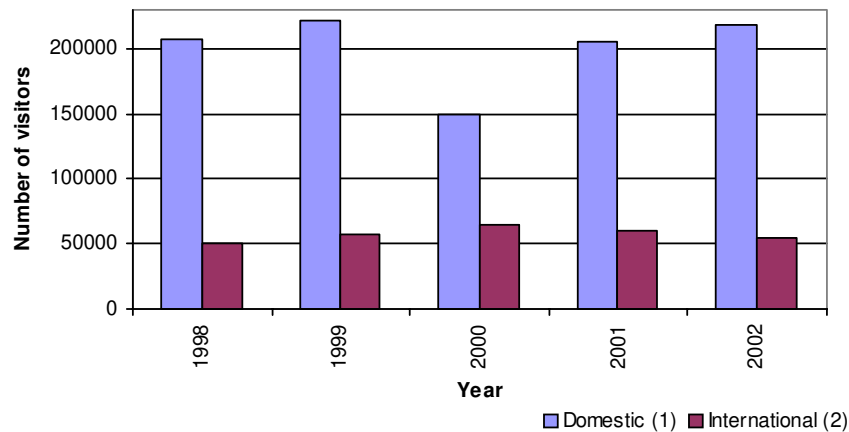


Source: CALM VISTAT (CALM 1993, unpub.-a)

The sealing of the road and completion of the resort would also have been accompanied by active marketing to attract more visitors to the region. The West Australian Tourism Commission use Monkey Mia as one of their major marketing icons, and the dolphin interaction is often used in marketing by the Australian Tourism Commission (Shadbolt 1998). Growth from the domestic market has been low but the international market growth is substantial. VISTAT data shows that the international market has grown from 10% of total visitation in 1991 to 40% of total visitation in 2003 (Figure 19). These figures are in accordance with research conducted by the West Australian Tourism Commission that shows that on average 30% of visitors to the Gascoyne region² are international visitors (Figure 19) (WATC 2002a). The total number of visitors to the Gascoyne region is similar to those that visit Monkey Mia (Figures 18 and 19). The visitor data shows that the number of local domestic tourists is declining. The question remains that is this because Western Australians are averse to development or that their tolerance to increasing visitor numbers is less than for interstate and overseas visitors who may live in more densely populated centres than Perth and therefore more tolerant to higher levels of development in natural areas.

² The Gascoyne Region includes the towns Denham, Carnarvon, Gascoyne Junction, Coral Bay and Exmouth.

Figure 19: Annual visits to the Gascoyne Region (1998 to 2002)

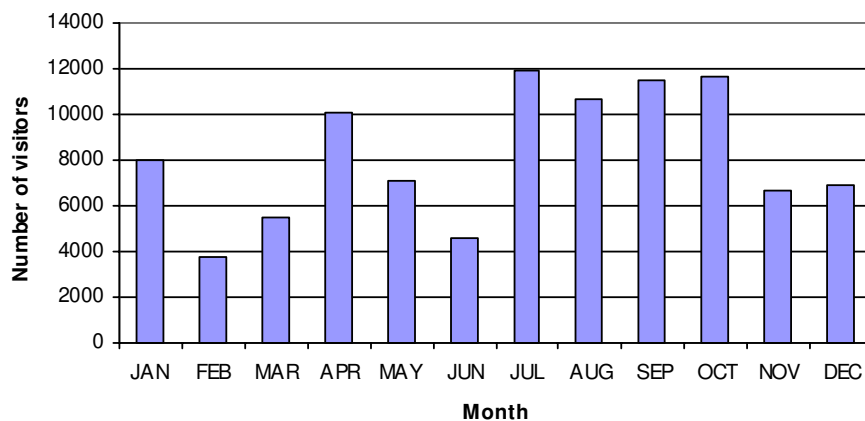


Note: Domestic = Australian residents aged 15 yrs and over who spent at least one night away from home in Western Australia, International = International visitors aged 15 yrs and over who spent at least one night in the region.

Source: (WATC 2002a)

Monthly visitor figures over a three-year period (2000 to 2002) were averaged (Figure 20). Distinct peak periods occur during Western Australian school holidays. July is the most popular month and February is the least popular (Figure 20). The lower visitor numbers in the summer months (December to February) are in part, due to the hot and windy conditions experienced in the region, while the mild winter months are preferred.

Figure 20: Average monthly visits to Monkey Mia Reserve (2000-2002)



Source: CALM VISTAT (CALM unpub.-a)

Interviewees stated that increasing visitor numbers were not of an immediate concern as, at present, current visitor levels are relatively consistent. Of more concern are short-term pressures that cause a fluctuation in visitor numbers. For example, in February 2004 the cruise ship ‘Europa’ visited Denham carrying an additional 300 tourists who wanted to visit Monkey Mia on a single day. To deal with the influx of tourists, visits were staggered throughout the morning resulting in visitor numbers for the dolphin feeds being 82, 120 and 156. This was manageable from CALM’s perspective because all of the tourists did not visit at the same time. An activities program was also put in place for the day and the community arts association set up displays of local wares to disperse visitors throughout the area. During the feeds all staff were available to go on to the beach to handle any potential issues that overcrowding may have caused. The feedback received in regards to this event was positive and visitor numbers were not considered excessive considering a normal feed in peak periods (July school holidays) could have up to 200 people at any one feed (I. Anderson 2004, pers. comm., 2 August).

Problems are more likely to arise when large groups visit Monkey Mia during peak periods. On 27 July 2004, Monkey Mia was visited by 300 French scientists that wanted to visit during the first feed of the day. In normal circumstances, July is a peak period for visitation and it is likely that up to 700 people can be involved in the dolphin interaction within a day. In July school holidays, on average 230 people are involved in the first feed of the day, which generally occurs between 8.00am and 8.30am. These figures are based on visitation and feeds during the July school holidays for 2004 (11 July to 15 July 2004). The visit by French scientists coincided with

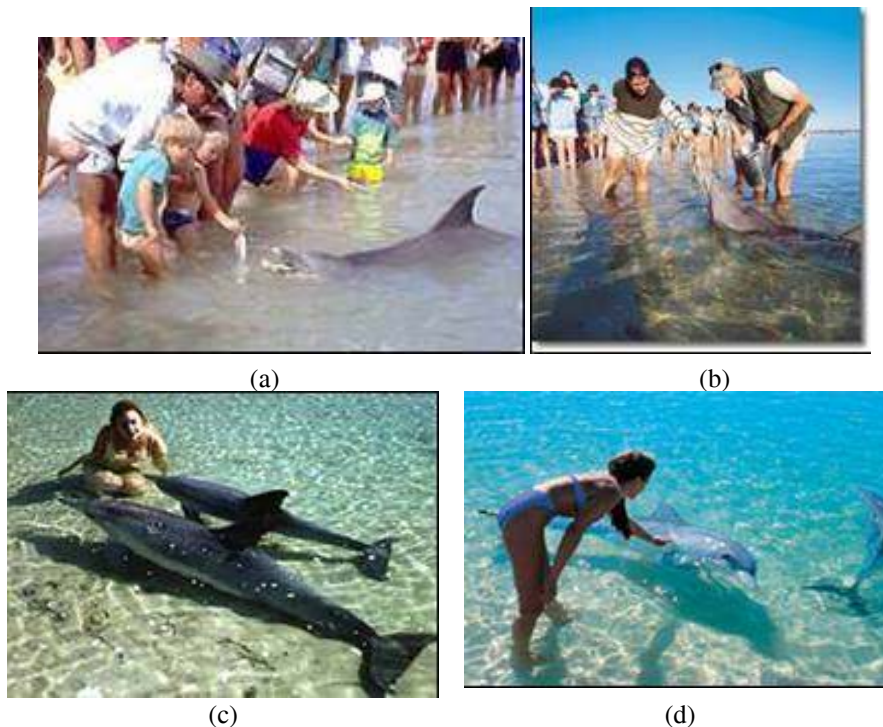
the July peak period and there was up to 650 people at the first feed (three times more people than usual at this time of year). The crowd in the dolphin interaction area was five to six people deep with visitors physically jostling to view and photograph three adult dolphins and three calves. CALM staff were pushed and verbally abused by visitors during the interaction. The current number of staff (six) was inadequate to deal with such large numbers of visitors. As a result of this experience, a large amount of negative feedback was received in regards to the number of visitors and the conduct of the crowd (I. Anderson 2004, pers. comm., 2 August).

Interviewees stated that the major concern for the future management of Monkey Mia is the potential increase in visitor numbers as a result of accommodation expansion (see discussion in section titled ‘Historical Recreation Use and Development of Monkey Mia’). An increase in visitors may threaten visitor satisfaction as illustrated above, in particular during the first feed of the day. If the Monkey Mia Dolphin Resort were to expand (as proposed) to accommodate 1,200 people (twice the number of people it currently accommodates) this may mean that up to 700 people could be on the beach at any one time. As illustrated above this can greatly affect visitor satisfaction, which is of great concern to CALM. Interviewees stated that an increased number of visitors would result in the necessity to increase staff numbers to deal with the volume of people. This may further reduce visitor satisfaction due to an increased authority presence, which may detract from a person’s experience.

Increasing visitor numbers also poses a problem because of on-site accommodation. Interviewees stated that as a result of on-site accommodation it would be problematic to limit overnight visitors access to the beach. Further, as three feeds per day are not guaranteed getting visitors to book a time slot is not feasible. Additionally, as there are no fixed feeding times, for the welfare of the wild dolphins, limiting use to fixed time slots would be discouraged as a management option. At present, there are no means to regulate or limit arrivals to Monkey Mia and no compulsory prior booking mechanisms in place to prevent overcrowding.

If visitor numbers were to increase, a number of management options could be put in action. Interviewees stated that it was preferable that the Shark Bay region is better promoted to take the focus off the dolphins of Monkey Mia. Promotion of World Heritage values, reptiles, mammals, and wildlife cruises (dugongs, turtles and sea snakes) should be more widely promoted as a reason to visit Shark Bay. Additionally, it was suggested that appropriate marketing and management are overlapped. At present there are various marketing strategies used. Some promotional material shows dolphins with a crowd on the beach (Figures 21a and 21b) while others show a single person on the beach touching dolphins (Figures 21c and 21d), which is misrepresentative of the situation that occurs at Monkey Mia making management of visitor expectations difficult.

Figure 21: (a & b) Representative portrayal of dolphin feeding at Monkey Mia; (c & d) misrepresentative portrayal of dolphin feeding at Monkey Mia



Source: (a) (Fairfax Walk About 2003); (b, c & d) (Monkey Mia Dolphin Resort 2004; Visit Western Australia Online 2004)

Misleading information is also printed in promotional material such as: ‘As a visitor to Monkey Mia you may swim in the dolphin’s home range, beside the dolphin feeding area and have a dolphin join you. The secret of getting close is not to approach it, let the dolphin come to you’ and ‘...however there is no charge to view the dolphin feeding or have the dolphins swim with you.’ (Monkey Mia Dolphin Resort n.d.). While this information

is not strictly incorrect, dolphins may approach you while you are swimming, it is misleading in that this is neither a common experience nor one that should be expected by a visitor.

CALM promotes the interaction experience as 'These dolphins are wild animals that come to the beach of their own free will to interact with people and accept fish from them. The CALM rangers carefully regulate all feeding activities to ensure that the dolphins don't become too dependent on hand-outs and continue to forage normally in the wild' (CALM 2003b) (Figure 22). This description is an accurate representation of the current situation experienced by visitors in the dolphin interaction area. Welford et al. (1999) highlighted the necessity and responsibility of stakeholders to accurately portray a destination and the experiences offered to visitors through marketing to ensure informed and responsible clients.

Figure 22: CALM promotion of dolphin interaction experience



Photo: (CALM 2003b)

Several management actions have already been put in place to deal with increasing visitor numbers and to further improve the visitor experience. Interviewees stated that during peak holiday periods free activities have been developed and been offered to visitors since 2002, although these activities are restricted by funding restraints. Activities are offered such as: live reptile and raptor displays, marine discovery touch pool, beach combing, sand sculptures, face painting, family fishing clinics, safe diving and snorkelling, Monkey Mia bird walk, radio tracking presentations, feral animal control talks and demonstrations and research seminars. Other local community and Aboriginal activities have also been implemented and include: spear and boomerang throwing, traditional hunting and turtle talks, bush foods and local Malgana language. These activities are promoted on the CALM website and also on-site at Monkey Mia in the form of leaflets and signage.

Additionally, new signage was installed in December 2003 to provide information on the location of no swimming areas, beach dolphin information and to identify walk trails. There are plans to upgrade the Monkey Mia Discovery Trail (Figure 13) in the future to include more interpretation including information on the flora and fauna.

The development and subsequent management of Monkey Mia was considered a success by interviewees. The dolphin interaction is now sustainable as a result of interpretation and management. This is illustrated in the reduction in calf mortality in provisioned dolphins to a level similar to offshore dolphins. Interviewees also stated that the development of the resort has also assisted in decreasing impacts. People no longer camp or drive on the beaches resulting in a reduction of 4WD tracks, erosion and vegetation loss. Illegal camping has been greatly reduced and is only occasional. Additionally, a defined walk trail concentrates use. Further, more interpretation is offered with the visitor centre and an increased ranger presence provides additional information on-site and during dolphin interaction.

Development of the resort has created its own issues. Future management of visitor numbers is problematic. Interviewees stated that if the resort had not been developed then the environment would still have benefited. There would have been less people and no overnight stays. A more natural experience may have been offered if only a visitor centre had been developed with the site becoming a day use only site. The presence of on-site accommodation creates difficulties in applying management actions such as limiting use. Asking visitors to not come down to the beach when they are staying at the resort is not feasible. If on-site accommodation were not present staffing costs would also be lower as the entry station would not have to be manned four such long hours (7.30am to 6.00pm).

Monkey Mia Visitor Survey Results

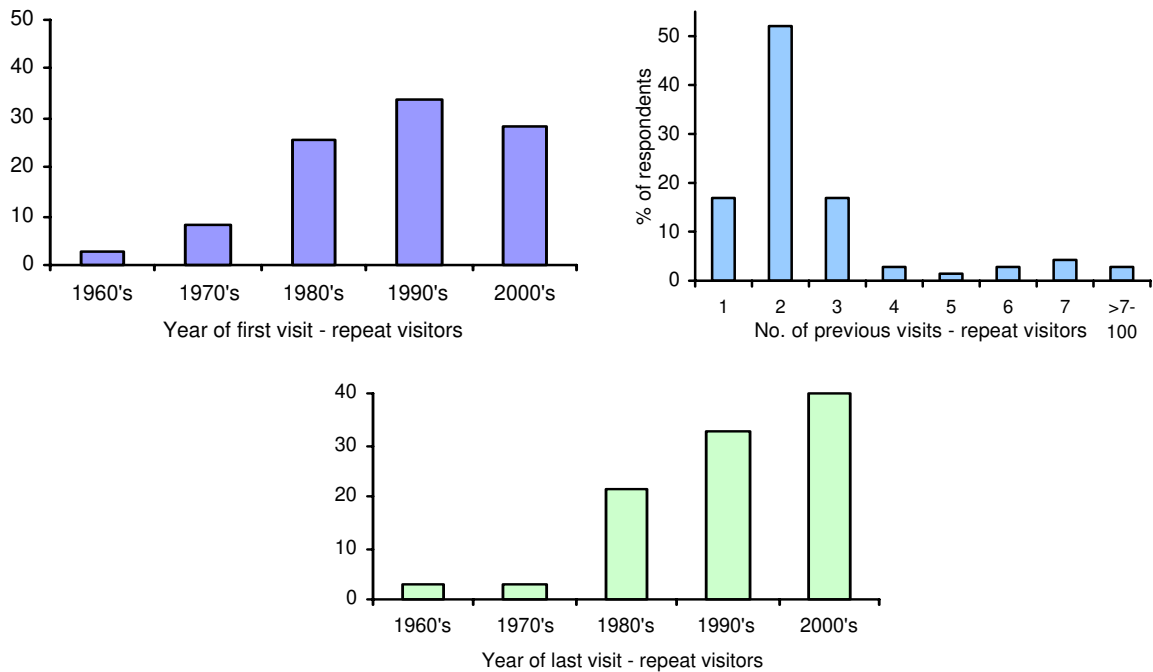
This section reports the results from the Monkey Mia Visitor Survey (Appendix C). The results relating to the social survey are presented in the following parts: visit and visitor characteristics; reasons for visiting; activities and facilities; reasons for visiting; preferred natural area experience, access and encounters; existing conditions; expectations; and potential management actions. A total of 217 Monkey Mia Visitor Surveys were distributed at Monkey Mia, of those 207 were returned, representing a response rate of 95%.

Visit and Visitor Characteristics

This section reports on the results of Part I and Part V of the Monkey Mia Visitor Survey (Appendix C). The questions in this section addressed respondents' most recent visit to Monkey Mia. Questions addressed characteristics such as details of previous visit; length of stay of most recent visit; type and size of group; type of transport and accommodation; and respondents' origin, age bracket and gender.

Eighty-five percent of all respondents (N = 207) were visiting Monkey Mia Reserve for the first time. Of those who had previously visited Monkey Mia (N = 31), the year of first visit ranged from 1978 to 2003 with a majority of respondents visiting in the 2000's. More than half of the repeat visitors had visited the Reserve on at least two occasions and were likely to visit either once or less than once per year (Figure 23).

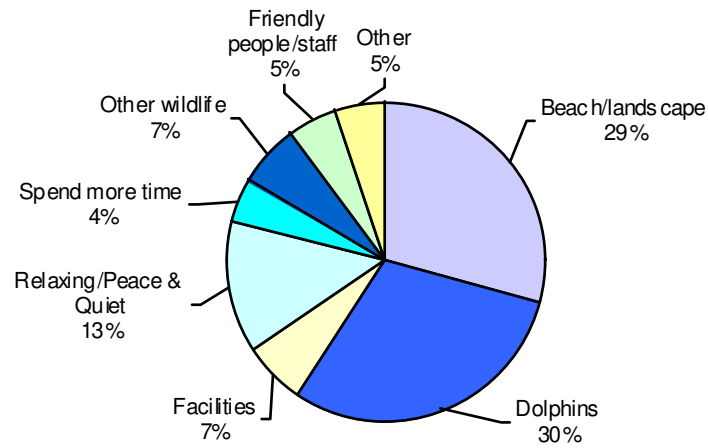
Figure 23: Year of first visit, number of previous visits and number of visits per year to Monkey Mia (N = 31)



A number of social surveys have been conducted in the Monkey Mia and Shark Bay area. The earliest survey was conducted in 1988 at Monkey Mia by the Western Australian Tourist Commission (WATC 1988). This survey was conducted prior to the Denham-Monkey Mia Road being sealed or the completion of the resort. A total of 177 visitors were surveyed at Monkey Mia over a four-day period (8 to 11 August, 1988). The findings above are similar to the WATC 1988 survey where a majority (72%) of the respondents were first time visitors to Monkey Mia and the Shark Bay region (WATC 1988). More recent surveys were conducted by CALM over a six- to eight-day period at Monkey Mia in May 2002 (N = 200), October 2002 (N = 96) and June 2003 (N = 86). Similarly, these surveys also found that a majority of respondents were first time visitors to Monkey Mia (CALM 2002a, b, 2003a).

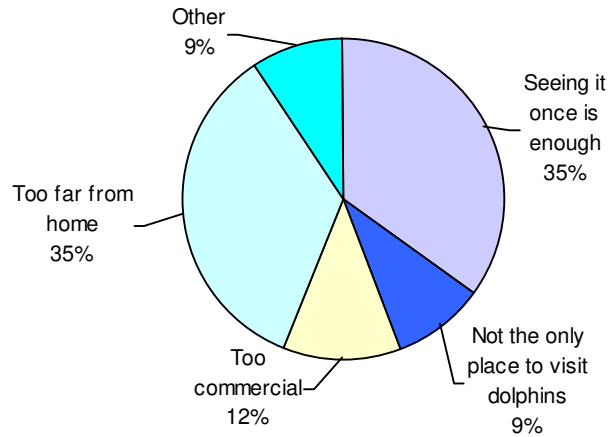
For those visitors for which the current visit was the first visit to Monkey Mia, a majority of respondents (67%) said that they would return. The major reasons for returning were 'the dolphins', 'beautiful beach and landscape' and 'relaxing/peace and quite' (Figure 24).

Figure 24: Reasons to return to Monkey Mia (N = 207)



For those first time visitors who would not return to Monkey Mia (22%), the main reasons were: ‘too far from home (overseas)/long way to drive’, ‘seeing it once is enough’, and ‘too commercial’ (Figure 25).

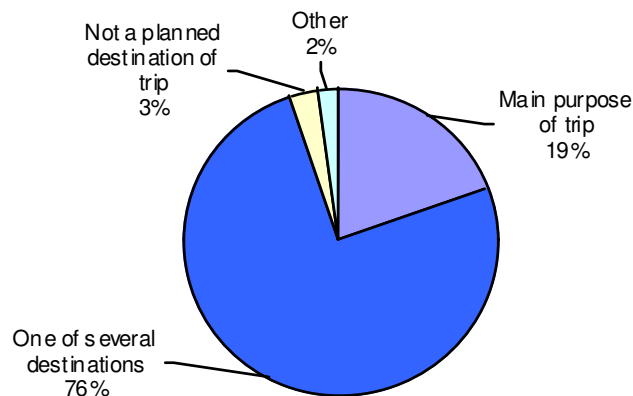
Figure 25: Reasons for not returning to Monkey Mia (N = 207)



The WATC survey conducted in 1988 also found that a majority of respondents (64%) intended to return to the Shark Bay region. Similarly, for the respondents who did not intend to return to Shark Bay (N = 42), the most frequent reason given was ‘its too far to travel’ (81%) (WATC 1988).

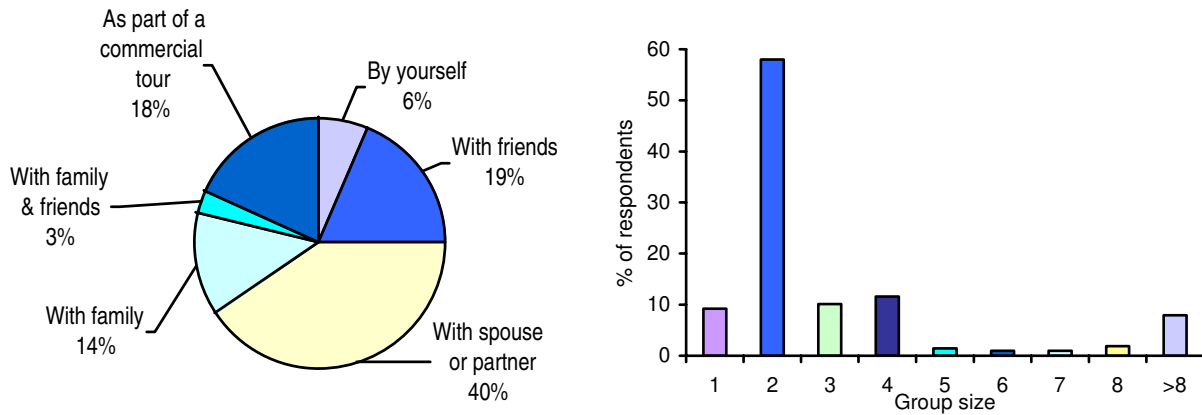
A majority of respondents (76%) stated that Monkey Mia was one of several destinations on this trip, while 19% stated that it was the main purpose of the trip (Figure 26). These results indicate that Monkey Mia is part of a multi-destination trip by visitors.

Figure 26: Travel patterns of visitors to Monkey Mia Reserve (N = 207)



Respondents were most likely to visit with a spouse or partner (40%), with friends (18%) or as part of a commercial tour (18%) (Figure 27). Groups mostly consisted of two persons (58%) followed by four (12%) and three (10%) persons.

Figure 27: Type and size of group with whom respondents visited Monkey Mia (N = 207)

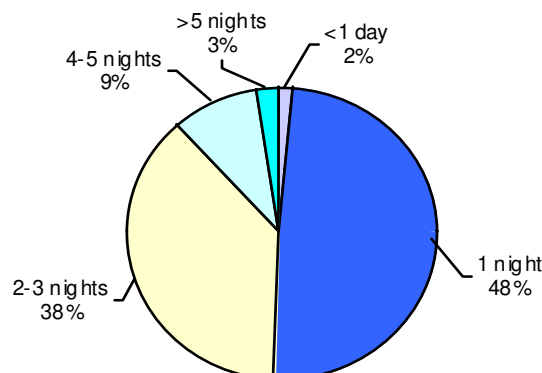


The 1988 WATC survey also found that travelling group sizes were two persons (58%) consisting of two adults followed by three to four persons (25%) with family groups represented by 16% of the survey sample (WATC 1988). A further visitor survey, conducted in 1995 by Reark Research to assist with tourism marketing strategies and infrastructure planning by assessing visitor satisfaction to the Shark Bay area (Reark Research 1995). A total of 752 respondents were surveyed during October and November 1995. The highest proportion of respondents were travelling as couples (38%) followed by family group (25%) or with friends (19%). The most common travel group size was two people (46%), then four people (15%) (Reark Research 1995). The surveys in the CALM Monkey Mia Reserve Visitor Survey Program also showed that the majority of visitors to the Reserve came in friendship or family groups (CALM 2002a, 2002b, 2003a).

The above findings are consistent with other natural area studies where party size is generally small, with the majority of visitor parties comprising from two to four people and most individuals participating as family, friendship, or mixed family and friendship groups (Hall & Shelby 1998; Lucas 1990c; Morin, Moore & Schmidt 1997; Polley 2002; Roggenbuck & Lucas 1987; Smith 2003; Smith & Newsome 2002). Hammitt and Cole (1998) found that the type of group in which one participated and the structure of the members within the group are determinants of outdoor recreation behaviour and can influence the amount and type of impacts occurring to the natural area. It was found that organised and friendship groups often use resources differently than family groups, with friendship groups being more likely to succumb to peer group pressure and engage in activities such as vandalism.

The length of stay during the respondents' most recent visit to Monkey Mia and the Shark Bay region was typically for one night (49%) followed by two to three nights (38%). Very few respondents visited for a day or less or for more than five nights (Figure 28).

Figure 28: Length of stay in Monkey Mia/Shark Bay region during most recent visit (N = 207)

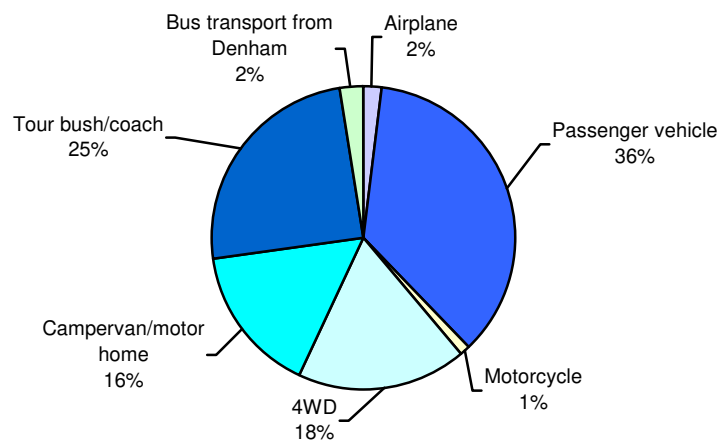


Similarly, the 1988 WATC survey found that respondents generally stayed two to three nights (45%) followed by one night (16%) in Shark Bay (WATC 1988). Very few respondents visited for more than four nights and 13% of respondents were day visitors to Shark Bay (WATC 1988).

From these results it would appear that most visitors stay in the Shark Bay region for a short period of time. This indicates that management can focus on short stay visitors or alternatively promote other aspects of the region to encourage visitors to stay longer. This trend for short stay visits has also been reported in other areas of Western Australia such as Nuyts Wilderness Area in the southwest of Western Australia (Morin et al. 1997) and Cape Range National Park, in the northwest of Western Australia (Polley 2002). As a result, applying management techniques that limit use such as decreasing length of stay would be ineffective.

Respondents were most likely to visit the Monkey Mia/Shark Bay region via passenger vehicle (36%), tour bus or coach (25%) or by 4WD vehicle (18%). Very few respondents travelled by airplane or motorcycle. (Figure 29).

Figure 29: Main means of transport to Monkey Mia/Shark Bay (N = 207)

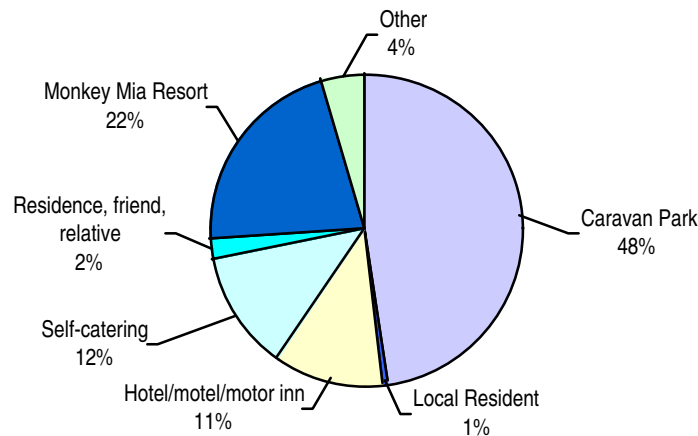


Similarly, the Reark survey from 1995 showed that 29% of respondents visited Shark Bay in a private or rented vehicle and 31% of respondents visited by coach (Reark Research 1995). Additionally, the CALM surveys showed that 9% in May and October 2003 and 4% of respondents in June 2003 visited Monkey Mia on a coach tour (CALM 2002a, 2002b, 2003a).

From the above results, the majority of visitors travel to Shark Bay in passenger vehicle, 4WD or tour bus/coach. The number of visitors travelling to Shark Bay via tour bus/coach seems to be highly variable and probably dependent on the time of year. In this survey, results show that overseas visitors generally travel via passenger vehicle (32%), tour bus/coach (27%) and campervan/motor home (22%). Interstate visitors generally visit via passenger vehicle (38%), campervan/motor home (27%) or 4WD (23%), while Western Australians generally travel via passenger vehicle (40%), 4WD (38%) and tour bus/coach (19%).

The majority of respondents stayed in a caravan park (46%) while visiting the Monkey Mia/Shark Bay region. This was followed by a stay at the Monkey Mia Resort (21%), self-catering accommodation (12%) and hotel/motel/motor inn (11%) in Denham (Figure 30). While the majority of overseas respondents stayed in a caravan park, they also stayed at Monkey Mia resort (24%) and a hotel/motel/motor inn (12%) in Denham. Interstate visitors also mostly stayed at a caravan park (58%) or Monkey Mia Resort (27%), while Western Australian respondents showed a larger range of accommodation preferences with 35% staying at a caravan park (35%), self-catering accommodation in Denham (27%), and the Monkey Mia Resort (16%).

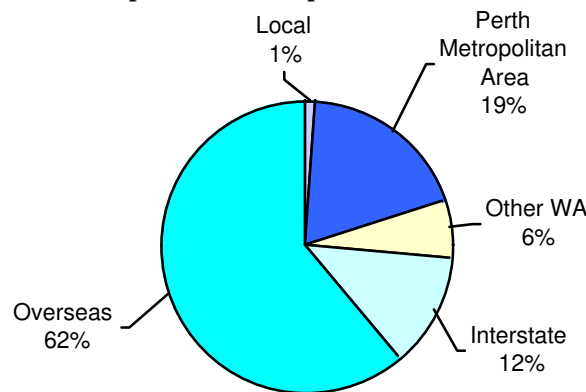
Figure 30: Type of accommodation stayed in while visiting Monkey Mia/Shark Bay (N = 207)



In 1988, the WATC survey found that 73% of respondents stayed in a caravan park followed by self-catering accommodation (20%) and hotel/motel/motor inn (2%) (WATC 1988). In 1995, the Rreak survey also found that the majority of respondents stayed in a caravan park (42%) followed by self-catering accommodation (15%) and a higher proportion of respondents stayed in hotel/motel/motor inn (23%) (Rreak Research 1995).

The majority of respondents normally live overseas (62%). More than half of the overseas respondents were from Europe (55%) with 29% coming from United Kingdom, 11% coming from Germany and 8% of overseas respondents coming from Switzerland. Twenty-six percent of the respondents were from Western Australia with 19% coming from the Perth Metropolitan Area, 6% from other areas in Western Australia and 0.5% being local residents of Shark Bay (Figure 31). Interstate visitors were from Victoria (6%), New South Wales (5%) and Queensland (2%).

Figure 31: Respondents usual place of residence (N = 207)



In the 1988 WATC survey, the highest proportion of respondents visiting Shark Bay were Western Australians (55%) with 36% of respondents visiting from interstate and 9% of respondents from overseas. In the 1995 Rreak survey, the highest proportion of visitors were from overseas (36%), followed by interstate (33%) and Western Australia (32%) (Rreak Research 1995). This survey showed a higher proportion of Western Australians visiting Monkey Mia than surveys conducted since the development of the resort and sealing of the roads.

In the CALM surveys, the highest proportion of respondents were visiting Monkey Mia from overseas (49% in May 2002, 31% in October 2002 and in June 2003), followed by interstate visitors (30% in May 2002, 26% in October 2002 and 25% in June 2003). For Western Australian visitors, only 21% were represented in the May 2002 survey with 14% of visitors being from the Perth metropolitan area. In October 2002, 43% of respondents were Western Australian visitors with 32% being from the Perth metropolitan area. While in June 2003, 44% were Western Australians with 25% of visitors being from the Perth metropolitan area (CALM 2002a, 2002b, 2003a).

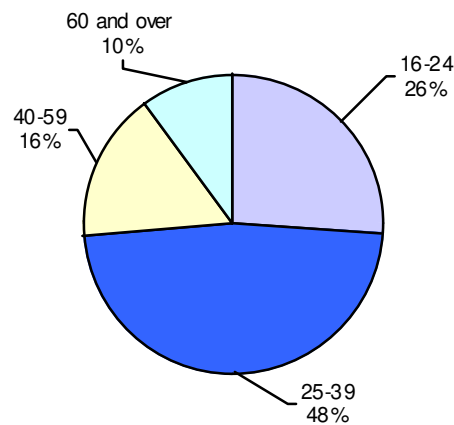
The results that the majority of visitors are not Western Australians is in contrast to other studies conducted in non-marine based studies elsewhere in Western Australia. Other Western Australian studies found that visitors generally live relatively close to the area visited and are often from urban areas (Morin et al. 1997; Smith 2003;

Smith & Newsome 2002). Alternatively, and in accordance with studies conducted in Monkey Mia and Shark Bay since 1995, other Australian dolphin interaction and viewing studies show that the majority of respondents were from overseas and interstate (Mayes & Richins 2004; O'Neill, Barnard & Lee 2004).

It would appear that the reason for the high proportion of first time visitors might be as a result of the distance necessary to travel from a major centre to Monkey Mia as indicated by the response for reasons to not return by first time visitors being that it was 'too far from home/long way to drive'. Monkey Mia is 856 km from Perth, which equates to an approximately nine-hour drive. As discussed previously in the section 'Current Recreation Use', there have been an increasing number of international tourists visiting Monkey Mia. Further, the surveys discussed above show that the proportion of Western Australian visitors has reduced since 1988, while the proportion of interstate visitors has remained relatively consistent from 1988 to 2003. The decline in Western Australian visitors is not known. The high proportion of international visitors may be due to Monkey Mia being part of a multi-destination trip and Monkey Mia being used as an international marketing icon.

The highest proportion of respondents contributed to the 25 to 39 year age bracket (47%) followed by the 16 to 24 year age bracket (26%) (Figure 32). There were a higher proportion of female survey respondents with a ratio of 58:42 female to male. To verify these figures, a count was taken of the number of people participating in the interaction at each of the dolphin feeds during the survey period and the number of males and females were also counted. These counts found on average a 57:43 female to male ratio. These figures highlight that more females than males participate in dolphin viewing.

Figure 32: Age groups of respondents (N = 207)



In 1995, the highest proportion of the Reark survey respondents contributed to the 30 to 49 age bracket (37%) followed by the 50+ (33%) age bracket (Reark Research 1995). Similar to the above results the CALM surveys had the highest proportion of respondents in the 25 to 39 age bracket followed by the 40 to 59 age bracket (CALM 2002a, 2002b).

Visitors to Monkey Mia tend to be in varying age brackets depending upon the time of visit. This study and the CALM surveys tend to show the highest proportion of visitors being in the 25 to 39 age bracket while the Reark survey shows respondents being slightly older although there is overlap between categories. These findings are similar to findings from studies conducted in the southwest of Western Australia (Morin et al. 1997; Smith 2003) and the younger age bracket (16 to 24 years) similar to findings from Warren National Park in the southwest (Smith & Newsome 2002). Similarly, respondents in Australian dolphin interaction and viewing studies elsewhere were on average under 30 at the Dolphin Discovery Centre in Bunbury, Western Australia (N = 223) (O'Neill et al. 2004) and the majority of respondents were under 30 in Port Phillip Bay in Victoria, Australia (N = 100) (Mayes & Richins 2004).

The above results further indicate a higher proportion of female survey respondents. The Reark survey reported a 57:43 female to male ratio, while the CALM surveys similarly found the ratio of female to male respondents was 58:42 in June 2003 and 56:44 in October 2003 and May 2002 (CALM 2002a, 2002b, 2003a; Reark Research 1995). This trend is consistent with other ecotourism surveys conducted since the mid 1990's which have shown a pattern of disproportionately high female representation whereas formerly there was a higher proportion of males (Weaver 2001). Blamey and Hatch (1998) reported from a study of inbound tourists in Australia in 1996 that 55% of 'nature-based' tourists at that time were female. This study reported that males were however, more likely to engage in whale watching than females (Blamey & Hatch 1998). This finding is in contrast to the survey conducted at Monkey Mia although Blamey and Hatch's study did not specify if dolphin viewing was included in the category of whale watching. Other Australian studies that examined dolphin watching and interaction reported similar findings to the Monkey Mia study in that there was a higher proportion of females to males (Mayes & Richins 2004; O'Neill et al. 2004).

Activities and Facilities

The questions addressed in this section relate to the sites and facilities respondents used while visiting Monkey Mia and the activities that they participated in. Respondents generally used a wide variety of facilities and participated in numerous activities. The most commonly used facilities included the toilets, shop, jetty, the Monkey Mia Visitor Centre and the café/restaurant (Table 4). A majority of respondents participated in viewing dolphins/dolphin interaction, photography and swimming (Table 4).

Table 4: Sites, facilities and activities used and participated in by respondents at Monkey Mia

Sites/facilities used at Monkey Mia	% of respondents (N = 207)	Activities participated in at Monkey Mia	% of respondents (N = 207)
Monkey Mia Visitor Centre	61	Fishing	9
Monkey Mia Resort	43	Viewing dolphins/dolphin interaction	95
Café/restaurant	56	Viewing marine wildlife	46
Jetty	65	Viewing terrestrial wildlife	20
Boat launch ramp	3	Organised cruise of Shark Bay Marine Park	39
Shop	65	Swimming	55
Toilets	84	Snorkelling/diving	19
Barbecues	12	Boating	4
Monkey Mia walk trail	16	Walking/hiking	31
Lawns at Resort	39	Camping/caravanning	42
Beach Shelters	37	Photography	69
		Picnic/barbeque	24
		Commercial tour	13

Similarly, in 1995 the most commonly undertaken activities in Shark Bay included: dolphin viewing (91%), filming/photography (71%), sightseeing (67%) and swimming (58%) (Reark Research 1995). None of the various other studies asked participants about the facilities that were used during their visit.

Reasons for Visiting

The following section reports on Part II from the Monkey Mia Visitor Survey (Appendix C). Survey respondents were asked to indicate how important each reason for visiting Monkey Mia was, ranging from not important to extremely important (Table 5).

Of the various possible reasons for visiting Monkey Mia, 'to view the dolphins' was ranked as extremely important by a majority of respondents (Table 5). When the results for very and extremely important were combined, respondents identified 'to view the dolphins', 'to be in and enjoy a natural environment', 'relaxing', 'to view wildlife' and 'to escape everyday routines' as the most important reasons for visiting Monkey Mia.

Table 5: Respondents reasons (%) for visiting Monkey Mia (N = 207)

Sites/facilities used at Monkey Mia	Not important	Minor importance	Important	Very important	Extremely important
To view the dolphins	1	3	12	23	60
To visit the Monkey Mia Visitor Centre	21	31	33	7	1
To visit the Monkey Mia Resort & its facilities	41	22	19	9	2
To go on a cruise	37	16	21	12	5
To spend time with companion(s)	17	12	18	20	22
Relaxing	2	11	22	27	35
To escape everyday routines	10	8	22	19	33
Fishing	70	9	5	2	3
Holiday, tourism	11	9	32	19	20
To view wildlife	2	5	24	29	31
To be in & enjoy a natural environment	2	1	23	32	35
To enjoy outdoor activities	8	9	22	32	19
To learn about nature (environmental education)	2	12	35	22	17
To visit a World Heritage Area	8	18	29	21	18
Swimming/snorkelling	17	19	28	17	11

The least important reasons for visiting Monkey Mia from the combined results of not at all important and minor importance were: ‘fishing’, ‘to visit the Monkey Mia Resort and its facilities’, ‘to go on a cruise’, and ‘to visit the Monkey Mia Visitor Centre’ (Table 5).

Similarly, the 1988 WATC survey found that the majority of respondents (94%) indicated that ‘holiday’ was the main purpose of their visit to the Shark Bay area with 70% mentioning the main reason was ‘to see the dolphins’ (WATC 1988). In 1995, the main reason for Reark survey respondents to visit the Shark Bay area was ‘to see the dolphins’ (69%) followed by ‘sightseeing’ (12%) (Reark Research 1995). The most commonly visited destinations within the Shark Bay area were Monkey Mia (98%), Denham (82%) and Shell Beach (61%) (Reark Research 1995).

The CALM Monkey Mia Reserve Visitor Survey Program (CALM 2002a, b, 2003a) indicated that 65% of respondents in May 2002, 76% in October 2002 and 88% of respondents in June 2003 visited the Reserve to see dolphins. The second most popular reason to visit the Reserve was holiday/tourism. A majority of the respondents had been involved in at least one dolphin interaction experience and showed that they were generally satisfied with this experience (Figure 33) (CALM 2002a, 2002b, 2003a).

Figure 33: Dolphin interaction at Monkey Mia in (a) December 2003 (approx. 95 people) and (b) July 2004 (approx. 290 people)



(a)

(b)

Photos: A. Smith

Activities undertaken were quite varied although, as expected, most visitors came to Monkey Mia to see the dolphins. Even though the major activity was dolphin viewing, respondents also participated in a wide variety of other activities. Activities that were rated as important were activities that were fairly passive forms of recreation. These findings are consistent with other natural area studies that show that visitors participate in a wide variety of activities that are generally passive forms of recreation (Chin, Moore, Wallington & Dowling 2000; Lucas 1990a; Morin et al. 1997; Roggenbuck & Lucas 1987; Smith 2003; Smith & Newsome 2002). Hammitt and Cole (1998) commented that visitors attracted to natural areas to experience and observe nature and

for passive forms of recreation, are likely to produce fewer impacts than the individual who visits the area for adventure or as simply a means to escape the home and work environment.

Preferred Natural Area Experience, Access and Encounters

The questions addressed in this section relate to respondents preference for certain ‘experiences’ when visiting natural areas. Respondents were asked to circle a response on a 5-point Likert scale that best matched their personal preference in regards to preferred natural area experience, access and social encounters.

A majority of respondents preferred natural areas with a very natural landscape with limited facilities (Table 6). Respondents preferred access in natural areas to be somewhat limited and access routes that are semi-developed (44%) with 27% of respondents giving a score of four that was between somewhat limited access (score of 3) and totally unlimited access with well developed access (score of five) (Table 7). Finally, 40% of respondents prefer to visit natural areas where meeting others is fairly likely during the visit, with 24% of respondents circling a response where meeting others is highly unlikely (Table 8).

Table 6: Percentage of respondents that rated the preferred natural area experience (N = 207)

1	2	3	4	5
in a totally natural landscape with no facilities (e.g. walk trails not well defined, no signage)		in a very natural landscape with limited facilities (e.g. walk trails are evident, some signage)		in a somewhat natural landscape with well developed facilities (e.g. visitor centre, developed walk trails)
5%	14%	44%	22%	13%

Table 7: Percentage of respondents that rated preference for access to natural areas (N = 207)

1	2	3	4	5
very limited with no direct access routes (e.g. rough walk trails, no roads)		somewhat limited and access routes are semi-developed (e.g. unsealed roads, developed walk trails)		totally unlimited with well developed access (e.g. sealed roads, well developed walk trails)
3%	10%	44%	27%	14%

Table 8: Percentage of respondents that rated preference for meeting others in natural areas (N = 207)

1	2	3	4	5
highly unlikely or minimal during visit (e.g. few people within sight or sound)		fairly likely during visit (e.g. others are present on walk trails, at the beach)		highly likely during visit (e.g. high levels of interaction with other visitors on-site)
24%	22%	40%	8%	4%

The CALM surveys also asked visitors questions about their natural area experience at Monkey Mia. Respondents were asked the rate the statement ‘I feel close to nature being here’ and ‘I thought this was an attractive natural area’, with 1 = strongly disagree and 7 = strongly agree (CALM 2002a, 2002b, 2003a). An average visitor rating of 5.6 was given in May 2002, 5.01 was given in October 2002 and 5.4 was given in June 2003 indicating that generally visitors agreed with the statement ‘I feel close to nature being here’. An average visitor rating of 6.1 was given in May 2002, 6.04 was given in October 2002 and 6.1 was given in June 2003, for the statement ‘I thought this was an attractive natural area’ also indicating that visitors agreed with the statement (CALM 2002a, 2002b, 2003a).

Existing Conditions

The following section reports on Part III of the Monkey Mia Visitor Survey (Appendix C). This is related to questions that asked respondents to determine if a range of items added or detracted to the quality of their experience and whether any additional environmental impacts were noticed while visiting Monkey Mia.

A list of 13 items was given and respondents were asked to indicate whether these items added or detracted to their experience at Monkey Mia. Most of the items either added to the visitor experience or had no influence. The presence of litter was a detraction for 46% of respondents or had no influence (36%) (Table 9). When the results for add and greatly add were combined, respondents indicated that ‘the presence of toilets’, ‘the presence of CALM rangers’, ‘the presence of beach shelters’, ‘the presence of lawns’ and ‘the presence of Monkey Mia Visitor Centre’ were the attributes that added to the quality of the visitor experience (Table 9). Attributes that

had no influence on the quality of the visitor experience by a majority of respondents were ‘the presence of the boat launch ramp’ (72%) and ‘the presence of barbecues’ (63%) (Table 9).

Table 9: Percentage of respondents that indicated items adding or detracting to respondents’ quality of visit (N = 207)

Item	Greatly detract	Detract	No influence	Add	Greatly add
Presence of Monkey Mia Visitor Centre	1	3	35	48	7
Presence of Monkey Mia Resort	4	11	38	32	8
Presence of Café/restaurant	1	8	41	37	9
Presence of jetty	0	2	42	47	6
Presence of boat launch ramp	0	4	71	16	3
Presence of shop	2	4	42	40	8
Presence of barbecues	1	5	63	20	6
Presence of toilets	1	0	19	45	30
Presence of Monkey Mia walk trail	0	0	43	42	10
Presence of lawns	1	2	40	43	13
Presence of beach shelters	0	0	38	37	20
Presence of litter	31	15	36	3	8
Presence of Conservation & Land Management Ranger/s	1	1	25	47	21

Respondents were asked whether they noticed any additional environmental impacts in Monkey Mia that they believed were caused by inappropriate behaviour by others. If the respondents answered yes, they were asked to describe the impact and its location.

A majority of respondents (82%) noticed no additional environmental impacts. Of the 18% of respondents that did notice environmental impacts, litter was the most common response followed by inappropriate infrastructure, inappropriate behaviour in the Dolphin Interaction Area and wildlife impacts (Table 10).

Table 10: Additional environmental impacts noticed by survey respondents

Environmental Impact and Location	% of respondents (N = 37)
Litter (Monkey Mia Resort, lawns, beach)	68
Inappropriate infrastructure (Monkey Mia Resort) <ul style="list-style-type: none"> – boat moorings and infrastructure too close to Dolphin Interaction Area – new accommodation at resort (inappropriate expansion) – noise from staff at resort including building activities and vehicles 	19
Inappropriate behaviour in the Dolphin Interaction Area <ul style="list-style-type: none"> – people being pushy during dolphin feed – loud, inappropriate talking during dolphin feed – people in water with calf before rangers arrived (6.30am) – staying in the water in the Dolphin Interaction Area 	14
Wildlife impacts (Monkey Mia Resort and walk trail) <ul style="list-style-type: none"> – natural fauna becoming domesticated due to the resort – people approaching birds too closely on the walk trail 	5

In 1988, WATC survey respondents were asked how satisfied they were with the things to see and do in the Shark Bay area with 53.7% saying they were very satisfied (WATC 1988). In the CALM surveys, a statement addressed the evidence of environmental degradation (e.g. erosion, littering, vandalism) that was seen (‘I saw evidence of environmental degradation e.g. erosion, littering, vandalism). Visitors generally did not see evidence of environmental degradation (rating of 1.6 in May 2002, 5.7 in June 2003 out of a possible score of seven with one being strongly disagree and seven being strongly agree). Of those that provided comments, the presence of litter was the most commonly reported with other comments including: erosion along the road and beach; sun lotion in the water; commercialisation; and the state of the toilet facilities (CALM 2002b, 2003a)

Survey respondents were generally equally concerned about biophysical impacts and social conditions. The presence of litter evoked strong responses and was found to detract from the quality of the visit. These findings are similar to other studies in natural areas. Various studies have found that many visitors react particularly

negatively to even small amounts of litter (Chin et al. 2000; Lucas 1990c; Martin et al. 1989; Morin et al. 1997; Roggenbuck & Lucas 1987; Smith 2003; Smith & Newsome 2002). The amount of litter is directly linked to visitor behaviour and as such is related to the moods and motivational forces underlying individual behaviour while on-site (Hammit & Cole 1998). Such strong responses might be because littering is viewed as a violation of strongly held norms and thus, seen as evidence of abuse rather than normal use (Lucas 1990a, 1990c). For those respondents that commented that litter had no influence on the quality of the visit it was often commented that litter had no influence because there was none and that Monkey Mia was very clean. Additionally, some respondents indicated that the level of litter was better than expected therefore it added to their experience.

Impacts such as inappropriate behaviour during the dolphin interaction are related to unacceptable visitor behaviour. Encounters with other visitors are important in affecting the quality of the visitor experience. Negative perceptions of the presence, behaviour and characteristics of other people depending on the normative behaviour and conditions accepted for the situation and setting can potentially result in visitor conflict (Cessford 2000; Lucas 1990b). Conflicting groups are typically visitors that are sharing sites and are competing for access to their desired recreation experiences (Cessford 2000; Cole & McCool 2000). Conflicts may also arise between people involved in the same activity but who differ in terms of the primary qualities they expect to experience (Cessford 2000; Cole & McCool 2000; Kearsley & Coughlan 1999; Manning & Lime 2000). While findings relating to inappropriate behaviour during the dolphin interaction is consistent with recreation literature on crowding and conflict, the behaviour of other visitors are one of the most important social conditions to other visitors (B.C. Forest Service 1995; Hammit & Cole 1998; Lucas 1990c; Manning & Lime 2000). As indicated above, visitors to Monkey Mia generally prefer a natural area experience where meeting others is fairly likely to highly unlikely. This further implies that behaviour is an important aspect of social conditions and that respondents are fairly tolerant of meeting other visitors providing the numbers are not beyond an individual's social norms.

Expectations

Survey respondents in the Monkey Mia Visitor Survey were asked to indicate whether a range of nine attributes were better, about the same or worse than they expected in relation to the expectations they had before arriving at Monkey Mia.

Generally, most of the respondents indicated that the attributes were about the same as they expected before arriving at Monkey Mia (Table 11). 'Sightings of dolphins' was an attribute that was considered better than expected by 52% of respondents when the results for better and much better than I expected were combined (Table 11). Further, the combined results indicated that the 'amount of litter,' 'condition of natural environment' and 'sightings of other wildlife' were similar for about the same and better than expected (Table 11).

Table 11: Percentage of respondents who indicated attributes that were better, about the same or worse than they expected (N = 207)

Items	Much worse than I expected	Worse than I expected	About the same as I expected	Better than I expected	Much better than I expected	No opinion
Location of the Monkey Mia Visitor Centre	1	3	45	23	10	16
Location of the Monkey Mia Resort	2	8	38	26	6	19
Number of other people at dolphin viewing	4	16	40	19	13	6
Number of other people at the Monkey Mia Visitor Centre	0	7	49	19	9	14
Behaviour of other visitors	0	4	56	19	8	12
Sightings of dolphins	3	5	33	21	30	4
Sightings of other wildlife	2	10	40	24	13	10
Condition of natural environment	1	3	45	29	15	6
Amount of litter	1	5	40	27	14	11

In 1988, WATC survey respondents were asked if their visit to Shark Bay met their expectations. The majority of respondents (58%) indicated that the visit was the same as they expected or better (29%) (WATC 1988). In the CALM surveys, the majority of respondents in the surveys indicated that they were generally satisfied with their overall visit to Monkey Mia (CALM 2002a, 2002b, 2003a). In May 2002, visitors were asked to rate the statement 'the visitor centre, amphitheatre, public toilets and car park are well managed (quality & cleanliness)'. The majority of respondents indicated that they agreed with this statement (CALM 2002a).

The number of other visitors and behaviour of other visitors were the same as expected by respondents.

While this does not indicate what respondents' expectations were, the previous questions imply that visitors were affected by visitor behaviour and preferred a natural area experience where meeting others was fairly to highly unlikely. This implies that further studies need to be conducted to determine how many people at a dolphin interaction are acceptable to visitors.

Potential Management Actions

This section relates to Part IV – Future Conditions of the Monkey Mia Visitor Survey (Appendix C). Survey respondents in the Monkey Mia Visitor Survey were asked to indicate how they felt concerning a list of seven management actions, if in the future, visitor use increased to a point where the resources or quality of experiences were threatened.

The respondents supported most of the management actions with exception to 'expand the Monkey Mia Resort' which was strongly opposed by 42% of respondents and 'prevent provisioning of dolphins' and 'provide more facilities' which were opposed by 35% and 33% of respondents respectively (Table 12). When the results were combined for opposed and strongly opposed, 74% of respondents opposed the expansion of the Monkey Mia Resort. The combined results for support and strongly support showed that a majority of respondents supported 'increase CALM ranger presence', 'discourage use of overused areas', 'provide areas with limited access' and 'limit use' (Table 12).

Table 12: Percentage of respondents that indicated attitudes towards potential management actions (N = 207)

Item	Strongly oppose	Oppose	Support	Strongly support	Neither support nor oppose
Expand the Monkey Mia Resort to accommodate increasing visitor use	42	33	13	3	9
Limit use (e.g. level/numbers of people entering Monkey Mia)	3	23	46	17	10
Discourage use of overused areas	2	11	42	30	11
Increase presence of Conservation & Land Management Ranger/s	2	8	43	30	15
Provide more facilities e.g. barbecues, beach shelters, toilets	9	33	27	11	18
Prevent provisioning (feeding) of dolphins	13	35	19	13	18
Provide areas with limited vehicular access to give a 'remote' visitor experience and provide environmental refuge areas	5	13	43	21	16

This survey showed support for regulatory actions that limit use and control behaviours of visitors. This indicates that there is a reasonable level of support for increased regulation and management intervention which gives managers a wide range of choices including restrictive actions. This may be due to the strong belief that negative impacts are caused by others and that enforcement will deal with others' misdemeanours (Morin et al. 1997; Smith 2003). Support for a range of regulatory actions were also supported in other Western Australian studies (Morin et al. 1997; Smith 2003; Smith & Newsome 2002). As discussed previously, while the survey results indicated that visitor behaviour was about the same as expected, there were comments about people's behaviour in the open-ended question addressing environmental impacts. This further highlights that the main concern associated with social conditions is the behaviour of visitors at Monkey Mia. The strong support for 'limit use (e.g. level/numbers of people entering Monkey Mia)' may imply that the number of visitors was acceptable but should not increase.

From previous surveys, it does not appear that respondents were dissatisfied with the level of management or ranger presence. The CALM surveys asked visitors questions about CALM staff. Respondents were asked to rate the statement 'the CALM staff were helpful and knowledgeable' with 1 = strongly disagree and 7 = strongly agree (CALM 2002a, 2002b, 2003a). The average rating for this statement was 6.3 in May 2002, 6.0 in October 2002 and June 2003 implying that visitors agreed with the statement. Additionally, 69% of respondents in the 1995 Reark survey rated the services provided by park rangers as 'good' (Reark Research 1995). The support for an increased presence of CALM rangers in this study further supports that visitors felt that behaviours of visitors should be controlled and that ranger presence was not detracting from their experience.

The above questionnaire indicates that a wide range of facilities provided at Monkey Mia were utilised by visitors during their visit. However, the presence of these facilities was of minor importance in relation to the reasons that respondents visited Monkey Mia. Important reasons for respondents visiting Monkey Mia related to

natural attributes and not built facilities. Further, respondents indicated that their preferred natural area experience was in a very natural landscape with limited facilities. It could be considered from this survey that the facilities are viewed as enhancing the visitor experience, as indicated by the response that the presence of toilets, beach shelters, lawns and the Monkey Mia Visitor Centre added to the quality of visit at the levels currently provided. Facilities may be considered as a positive influence on the visitor experience because of the convenience that they offer the visitor. Smith (2003) also found that facilities and walk trails were viewed as having a positive influence on the quality of the visitor experience because of the convenience they offer.

Respondents generally felt that the condition of the natural environment was about the same as they expected or better. While expectations are not clearly understood, after discussions with management and inspection of the site by the researcher during the survey, there were no obvious signs of impacts such as erosion, multiple access or walk tracks and 4WD tracks. Litter was low with only a small amount of cigarette butts or other small items of litter being present on the beach and lawn area near the restaurant.

Respondents opposed expansion of the Monkey Mia resort and providing more facilities. Further, there were comments about inappropriate infrastructure in the open-ended question addressing environmental impacts in this survey and in the question relating to reasons for not returning, respondents indicated that Monkey Mia was too commercial. This seems to follow a trend of resistance to expansion of the current facilities at Monkey Mia and Shark Bay. In 1988, as discussed previously, 26% of WATC respondents (N = 70) commented that the Shark Bay area should remain as it is i.e. not become too commercialised (WATC 1988). In 1995, Reark survey respondents were asked to suggest improvements to amenities and facilities in Shark Bay. Ten percent of respondents indicated that there should be less tourism/commercial development (Reark Research 1995).

While the majority of respondents opposed the provision of facilities, some respondents supported providing more facilities such as barbecues, beach shelters and toilets. However, it would appear that the level of development is sufficient at present considering that respondents also supported 'discourage use of overused areas' and 'provide areas with limited vehicular access to give a remote visitor experience and provide environmental refuge areas'.

These findings imply that the provision of facilities adds to the dimension of the tourist experience rather than detracting, providing the facilities do not greatly change the natural attributes of the area. Smith (2003) found that the provision of facilities in designated areas in the southwest eucalypt forests of Western Australia added to the visitor experience and also reduced environmental impact. The provision of facilities and restricting use to designated areas limits the areal extent of visitor related resource disturbance due to visitors spending time in the vicinity of such facilities. Further, facilities increase the efficiency of maintenance and visitor contact/enforcement activities (Hammit & Cole 1998; Leung & Marion 2000a; Marion & Farrell 2002). Some of the disadvantages of concentrating use in a single area, as in the case of Monkey Mia, is that there is an increased potential for problems with crowding, noise and conflicts with other visitors (Marion & Farrell 2002).

In summary, Monkey Mia has a long history of visitation. Initially the site had limited infrastructure and only basic facilities. Increasing popularity of the site resulted in negative social and environmental impacts. With the increasing popularity of the site there was also additional political, economic and social pressure to develop the site further and to upgrade existing facilities. After the development of the site, which included the development of the Monkey Mia Resort, there was a further increase in visitation and a growth of international visitors to the site. The increase in first time and international visitors also resulted in the need to offer more complex visitor information resulting in the development of the visitor centre in 2001. As a result of the development of Monkey Mia other natural attractions in the region have also experienced increasing levels of development. While visitor numbers appear to have stabilised there is still additional political and economic pressure to increase the size of the resort and a proposal to expand was approved in 2005.

Visitors to Monkey Mia are generally first time visitors that would like to return, with Monkey Mia being part of a multi-destination trip. Respondents were most likely to visit Monkey Mia with a spouse/partner, friends or family in a group of two to four persons aged in the 25 to 39 year age bracket. There was a higher proportion of female to males and the majority of visitors were from overseas and Western Australia with the lowest proportion of visitors coming from interstate. These visitors mainly travel to the region by passenger vehicle, 4WD or tour bus/coach and stay in caravan park accommodation. Visitors generally stay in the Shark Bay region for one to three nights, indicating short stay visits.

Visitors generally used a wide variety of facilities and participated in numerous activities, with viewing dolphins being their main reason for visiting Monkey Mia. Visitors generally prefer a natural area with a very natural landscape, limited facilities and semi-developed access. The facilities provided at Monkey Mia were not seen as detractive and generally had no influence on the quality of the visit. A majority of respondents indicated that the visit was the same as they expected before arriving at Monkey Mia. Respondents supported regulatory management actions that limit use and control behaviours and were strongly opposed to expansion of the Monkey Mia Resort.

Chapter 4

CASE STUDY 2: VALLEY OF THE GIANTS - TREE TOP WALK

The Valley of the Giants and Tree Top Walk is located 16 km east of Walpole in the Walpole-Nornalup National Park, Western Australia and is accessed via Valley of the Giants Road (Figures 2 and 34). The Tree Top Walk offers visitors a unique experience exploring the canopy of the tingle forest. Three species of tingle tree are present in Walpole-Nornalup National Park, including the red tingle (*Eucalyptus jacksonii*), Rates tingle (*E. brevistylis*) and yellow tingle (*E. guilgoylei*). These tree species are restricted to the Walpole area. The Tree Top Walk also has some karri (*E. diversicolor*) and a heavy understorey of *Acacia pentadenia* and *Allocasuarina decussata*. The Park has one of the richest reserves for orchids of any area in Australia (CALM 1992, 1994; Winfield 2001). Nineteen species of native mammal are found in the Park including the chuditch (*Dasyurus geoffroii*), Western ringtail possum (*Pseudocheirus occidentalis*) and quokka (*Setonix brachyurus*) which are specially protected fauna under the *Wildlife Conservation Act 1950* (CALM 1992; Government Gazette 2003). In addition, the Park has 109 species of birds, 22 species of reptiles and is also one of the richest areas for frogs in Western Australia, all of which are endemic to the southwest. The red tingle tree provides habitat for Gondwanan³ relict species of spiders that include *Baalebula* sp., *Dardarnus* sp. and the tingle trapdoor spider (*Moggridgea tingle*) which is declared as specially protected fauna under the *Wildlife Conservation Act 1950* (CALM 1992; Government Gazette 2003).

Walpole-Nornalup National Park covers an area of 21,500 ha with Valley of the Giants comprising 3,110 ha. The Park is an A Class⁴ reserve with the purpose of 'national park' (CALM 1992). The Park is currently managed by the Warren Region of CALM according to the Walpole-Nornalup National Park Management Plan 1992 (CALM 1992). The Park is not a continuous block and is divided and bordered by other land uses such as private property, townsites, shire reserves, river catchments, crown land, D'Entrecasteaux National Park, Irwin and Nornalup Inlet to the low water mark and the Southern Ocean to the high water mark (CALM 1992) (Fig. 34). The Valley of the Giants is mostly surrounded by private property (Figure 34).

Walpole-Nornalup National Park experiences a sub-mediterranean climate with mild summers and cold, wet winters (CALM 1992). Average summer temperatures range from 14°C to 25°C and average winter temperatures range from 7°C to 16°C (CALM 1992). The average annual rainfall is high 1,200 mm and is consistent throughout the year (falling on average for 185 days per year) which allows for the continued existence of relictual Gondwana invertebrates in the Park (CALM 1992).

The Tree Top Walk is located on a ridgeline, valley and intermittent creek. The soils are comprised of brown, gravely duplex soils over a yellow-brown and red-brown clay subsoil (CALM 1990). These soils are susceptible to water erosion if vegetation is removed and unsurfaced roads can become extremely slippery when wet (CALM 1990, 1992).

³ Gondwanan: 65 million years ago Australia was part of the super continent Gondwana (CALM 1992).

⁴ A Class Reserve: indicates that the land shall forever remain dedicated to the purpose specified, until by Act of Parliament those lands are declassified (Bates 1995).

Figure 34: Tree Top Walk showing surrounding land use, South Coast Highway, Walpole and Nornalup



Historical Recreation Use of the Valley of the Giants

Aboriginal people (Minang people) have occupied the southwest of Western Australia for at least 40,000 years and possibly as long as 50,000 years. Artefacts (backed blades) dated to approximately 6,800 years ago were found near the Park, making them the oldest backed blades found in Australia (CALM 1992). The Department of Aboriginal Sites has recorded seven sites in the area, however it is likely more sites exist as the Park has not been systematically investigated as yet (CALM 1992).

Sealers and whalers were the first Europeans to visit the area in the early 1800s. The first permanent settlers to the area came in 1910. At this time 372 ha was set aside as public reserve 13045 (Parklands) and in 1914 a further 159 ha was reserved 'for the protection of red flowering gum' (CALM 1992). In 1924, 12,137 ha was declared as Nornalup National Park with the first ranger being appointed in 1927. Small parts of the Valley of the Giants was damaged by fire in 1951 and was logged in the 1960s with regeneration operations completed in 1972 (CALM 1992). In the 1970s, only a few thousand people, mostly Western Australians, visited the Valley of the Giants each year (Winfield 2001).

In the 1980s the Valley of the Giant was a popular tourist destination to see the giant tingle trees with one particular attraction being a giant hollowed out tingle tree in which visitors could photograph themselves or their cars parked in its base. This hollowed out tree was a historic feature for visitation (Figure 35) (Winfield 1996, 2001). By 1989 there was a dramatic increase in visitor numbers. This was due in part to a growing international profile for Western Australia, the deregulation of domestic air travel and the surfacing of the Eyre Highway across the Nullarbor during the 1980s (Winfield 1996, 2001). The area was not designed to cater for such numbers and was not seen to be coping with the demand (CALM 1990).

Figure 35: Historical photo of car parked inside a giant tingle tree (Big Tree) at the original site in the Valley of the Giants



Source: Winfield (1996)

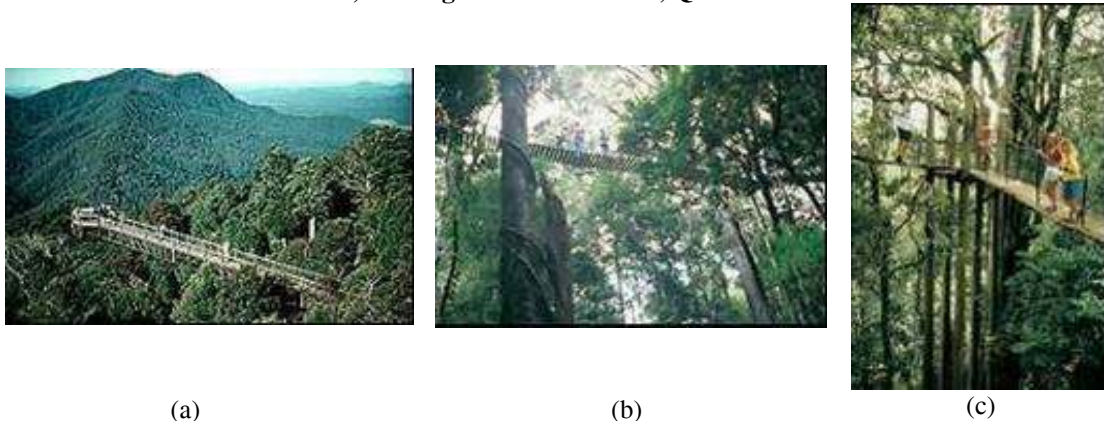
Visitation was largely uncontrolled and visitors were having a significant negative impact on the area. As a result of increasing visitor pressure, the gravel car park had considerably increased in size (Winfield 1996, 2001). Interviewees stated that the unsurfaced, gravel car park was too small to cope with the increasing demand with people parking in natural vegetation thus causing the area to increase in size. The trails to the trees had become a labyrinth of informal trails leading to every big tree in the area and interviewees stated that new trails were being formed. The bark on the trees had become polished by people touching the trunks and the humus layer became compacted, disturbed or removed (Winfield 1996, 2001). The base of the trees at many attraction trees was trampled by pedestrians and vehicles and for the main attraction tree the root zone was severely compacted resulting in its collapse in 1990 (Winfield 1996, 2001). Interviewees stated that impacts were mostly environmental not experiential and that no official quantitative monitoring occurred to determine the extent of the biophysical impact.

The draft management plan emphasised the need for redevelopment at the Valley of the Giants in the 1990's and the subsequent development plan stated the aim of redevelopment was to 'provide, through innovative design a world class, sustainable, nature based experience that also generates revenue for CALM's park, recreation and tourism program' (CALM 1994). Interviewees stated that development was driven mainly due to environmental concerns with some economic decisions. Visitor surveys done in conjunction with the management plan showed that there was a general trend for visitors wanting more from their visit to the forest including more information and interpretation, more facilities and more activities (Winfield 2001). In addition it was observed that there was little being offered to the many coach-loads of visitors at these sites (Winfield 2001). In 1993/4, an estimated 2,200 coaches were visiting the area (CALM 1994).

Interviewees commented that initially a number of different options were considered. One consideration was to close the site and create the experience elsewhere in the forest. This however was seen as transferring the problem elsewhere and was not a long-term solution. Alternatively, also considered was putting in boardwalks to reduce impact. It was realised however that this would have been at great cost. For example, for 150 metres of boardwalk at the Ancient Empire Walk cost approximately \$A200,000. The original Valley of the Giants walk was considerably larger than this.

Interviewees stated that the scope and scale of the project were decided after a financial plan and project design was outlined. In 1993, planning began. Guidelines were established in the management plan (CALM 1994), not specifically for the Tree Top Walk, but major redevelopment was proposed for the Valley of the Giants. Managers went to the east coast of Australia and visited rainforest sites with forest walks such as O'Reilly's Tree Top Walk in Lamington National Park, Queensland and Dorrigo Skywalk in New South Wales (Figure 36). These projects were a similar scale project to the proposed Tree Top Walk and were not charging entry fees. Interviewees stated that it was realised, based on the success of these projects, that if a fee were to be charged that the investment had to be reciprocal. It was also realised that there was the potential to make \$600,000 per year charging at \$4 per head for the projected visitor figure of 150,000.

Figure 36: (a) Dorrigo Skywalk, Dorrigo National Park, New South Wales (b&c) O'Reilly's Tree Top Walk, Lamington National Park, Queensland



Source: (a) Coffs Coast Visitor Information Centre (2004) (b) O'Reilly's Rainforest Guesthouse (2004)

The local community were also involved in the planning process for the Tree Top Walk. Community meetings were held with about 20 or 30 community members attending. Interviewees stated that at the time the major concern with the development was that a kiosk or café was to be included in the development. This was seen as direct competition with café's and restaurants in town (Guild 1996). This aspect of the proposal was not developed and only a coffee dispensing machine near the ticket sales was included at the site. There was also issue over CALM registering 'Valley of the Giants' as a trade name. Another concern by certain members of the community was the potential impacts the development would have on the environment.

After planning meetings and community consultation a design competition was held to explore the concept options and selection of a design team for the Tree Top Walk and Tingle Shelter. Designers were required to produce a plan that created little disturbance to the forest environment, minimised any long term impact on the bush and ensured visitor safety (CALM 1994; Winfield 1996, 2001). Additionally, strict aesthetic standards were required creating a structure that was sculptural, with attention to scale, form, line, colour and texture that would enhance the forest setting rather than standing out from it (Winfield 1996, 2001). The Tree Top Walk, Ancient Empire Walk and Tingle Shelter were major components of the site redevelopment, which also included new access roads, parking areas, visitor facilities, walk tracks, boardwalks and interpretative experiences (CALM 1994).

The Tree Top Walk was constructed in 1995/96 amongst a stand of relatively undisturbed giant tingle and karri trees in close proximity to the original degraded site. The site was officially opened in September 1996 (CALM 2004e). The cost of the entire Valley of the Giants project, including the Ancient Empire, cost \$A1.8 million. Interviewees stated that the new Tree Top Walk is about 100 metres from the original Valley of the Giants trails with the top end of the Ancient Empire Walk being part of the original trail. A lot of the original trails have since been rehabilitated and are now difficult to see. This venture has been considered a great success. By July 2003, more than 1.3 million people had visited the Valley of the Giants earning more than \$A2.5 million in revenue by 1999 (CALM 2004g, 2004b, 2004f). The Valley of the Giants has received enormous exposure in the media and has been adopted as a tourist icon for Western Australia. The Tree Top Walk has won several national and international awards since its opening in 1996 including: a National Project Award in Landscape Architecture in 1996 by the Australian Institute of Landscape Architects; the BHP Steel Award; two WA Civic Design Awards; Significant Regional Attractions category of the annual Western Australian Tourism Awards in 1998 and 1999; Most Significant Regional Attraction category of the National Tourism Awards in 2000; and the Environmental Experience category in the international British Airways Tourism for Tomorrow Awards in 2003 (CALM 2004b, 2004c, 2004d, 2004e, 2004f, 2004h).

Recreation Opportunities and Facilities

The most popular features of Walpole-Nornalup National Park are its large trees, the naturalness, scenery and peacefulness (CALM 1990). One of the most popular attractions for the area was traditionally and still continues to be the Valley of the Giants (CALM 1990, 1992; Winfield 2001). Visitor use is concentrated in a relatively small area with the overall design restricting visitors to two walking loops, visitor ticket sales and souvenir shop, toilets and interpretive display area. CALM managed facilities include the Tree Top Walk, which is a 600 m free standing cat walk through the canopy level of the tingle forest. The Tree Top Walk features six lightweight prefabricated metal bridge spans, each 60 metres long and four metres deep, supported between guyed pylons. The spans are designed to sway slightly as you walk, intended to recreate the feeling of sitting at the top of a

tree. The steel trusses rise slowly on a 1:12 grade over terrain that falls to a deep valley with the highest point being 40 metres above the creek bed (Figures 37 & 38) (Winfield 1996, 2001). Additionally, the low incline walkway enables easy access for people in wheelchairs (CALM 2004g).

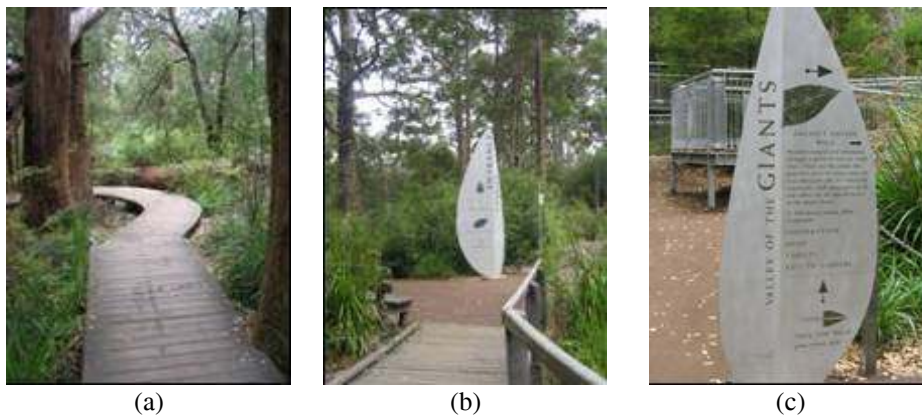
Figure 37: Tree Top Walk showing guyed pylons, walkway, viewing platform and bridge span



Photos: A. Smith

Other facilities include the Ancient Empire Walk (Figures 38 and 40), which is a 600 metre ground level walk trail divided into two stages. The first stage is a universally accessible boardwalk that includes wide paths, stable surfaces, no steps and no grades over 1:14 (Figure 38a). The second stage is a mixture of boardwalk and stabilized earth path that winds through several large tingle trees offering a sense of adventure with interpretive stops and seats for the more contemplative visitor and inspirational poetry sculpted into metal leaf structures or plaques embedded in the boardwalks at wide intervals (Figures 38b and 38c) (Winfield 1996, 2001).

Figure 38 (a) Ancient Empire Walk showing boardwalk, (b) stabilized earth path and seating, (c) metal leaf structure interpretive display



Photos: A. Smith

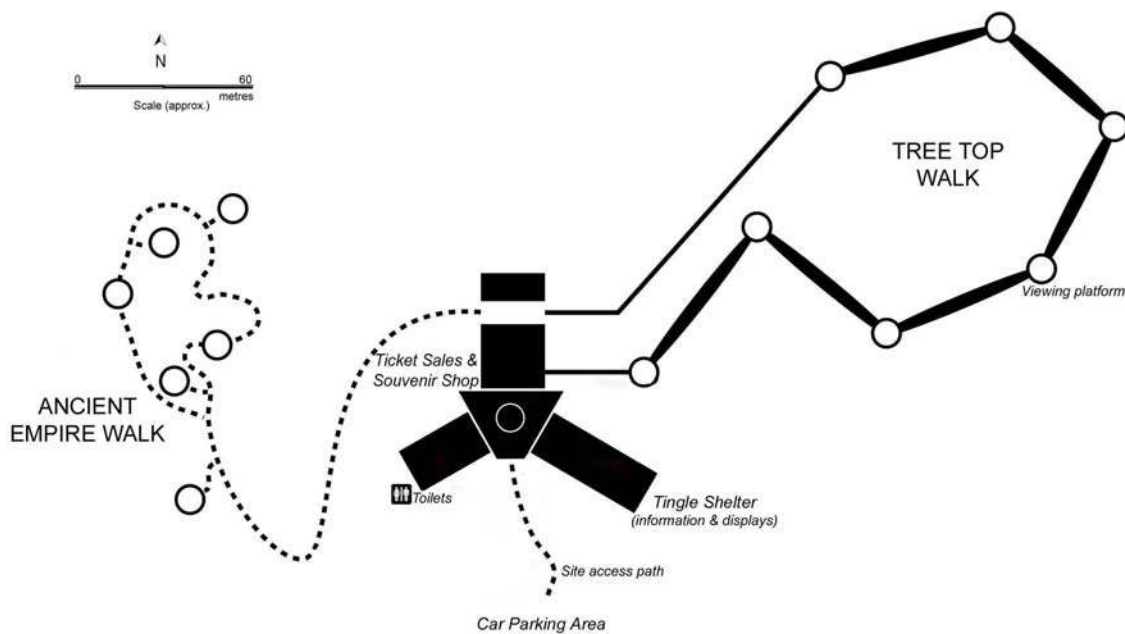
In addition to the two main walk trails, other visitor facilities include the centrally located Tingle Shelter, ticket sales and souvenir shop (Figure 39) and toilets linked by a 50 m hardened pathway to a 50 bay car park plus allowance for six tourist coaches (Figure 40). The Valley of the Giants is open to visitors from 9:00am to 5:00pm every day except Christmas Day and during extreme weather (lightning or very windy conditions). During the Western Australian Christmas school holiday period the Valley of the Giants is open from 8:00am to 6:00pm with the last ticket sold at 5:15pm (CALM 2003d).

Figure 39: Ticket sales and souvenir shop at Tree Top Walk



Photo: A. Smith

Figure 40: Tree Top Walk showing Ancient Empire Walk, Tingle Shelter, Ticket Sales and Souvenir Shop



Adapted from Andrew Stumpf, Stusha Studio (2004)

At present, there are no fees charged for entry into Walpole-Nornalup National Park. A fee is charged for entry to the Tree Top Walk and all visitors are charged this daily fee upon entry to the Tree Top Walk. The fee structure is as show in Table 13.

Table 13: General entry fee structure at Tree Top Walk (as at 4/2/04)*

Visitor	Admissions (9 am to 5 pm)
Family	\$14.00 (2 adults + children)
Adult	\$6.00
Child (6-15 years)	\$2.50
Children under 6	\$0

*Note: Last admission tickets sold at 4:15pm

As a result of increasing visitor numbers in the Walpole region a number of other sites have been upgraded. These initiatives include the development of roads, car parks and other structures for tourism. Interviewees stated that development in the area is not directly attributed to the Tree Top Walk however, increased visitation in the

area put pressure on existing facilities and therefore the need arose for these areas to be more accessible and to be upgraded to offer a diversity of activities to encourage repeat visitation to the region. Interviewees stated that the areas that have been upgraded as a result of increasing tourism use include: Circular Pool, Coalmine Beach, Fernhook Falls, Mandalay Beach, Conspicuous Cliffs and the Walpole townsite. Interviewees stated that revenue from the Tree Top Walk has been re-invested in park programmes and stays in the region. Additionally, in 2002 State government also allocated funds for capital works program to provide upgraded visitor facilities and improved access in these areas (CALM 2004a).

Works were being conducted at Circular Pool in 2004 to upgrade day-use facilities and improve visitor safety. The site was being revitalised. Coalmine Beach had existing facilities such as lookout points, heritage trail, walk tracks and a picnic area that included a wood barbecue and picnic tables and seats. The scenic drive (Knoll scenic drive) was upgraded from gravel to bitumen.

Fernhook Falls also had existing facilities that included: a gravel road, car park, day-use area, walk trails, viewing platform and stairs, canoe launch site and campground which included nine individual campsites including two cabins, and two pit toilets. Both the day-use site and campground were upgraded with works continuing in 2004 to include new boardwalks, sealed walk tracks, a new picnic area which included a picnic shelter with tables and water tank, gas barbecues, pit toilets, car park that included four coach parking and a newly constructed camp kitchen in the campground (Figure 41).

Figure 41: Upgraded visitor facilities at Fernhook Falls including (a) bitumen walk trails, (b) boardwalks and stairs, (c) picnic shelters, gas barbecues and tables, (d) camp kitchen in campgrounds and (e) boardwalks and canoe launching facilities



Photos: A. Smith

In 2000, Mandalay Beach was upgraded to include an all wheel drive track (gravel) that was previously 4WD only. The site also now has toilets (two pit toilets) and car park. Other facilities include: walk trail to beach, boardwalk and stairway to beach, viewing platform, water tank, and an interpretation display (Figure 42).

Figure 42: Mandalay Beach including car park, boardwalk and stairway to beach



Photos: A. Smith

Conspicuous Cliffs had the roads upgraded for all wheel drive access (some bitumen; mostly gravel) and interpretation was included in the form of an interpretive display board at the trailhead. Other existing facilities included boardwalks and lookout and a gravel car park (Figure 43).

Figure 43: Conspicuous Cliffs including interpretive display board, boardwalk and stairway to beach



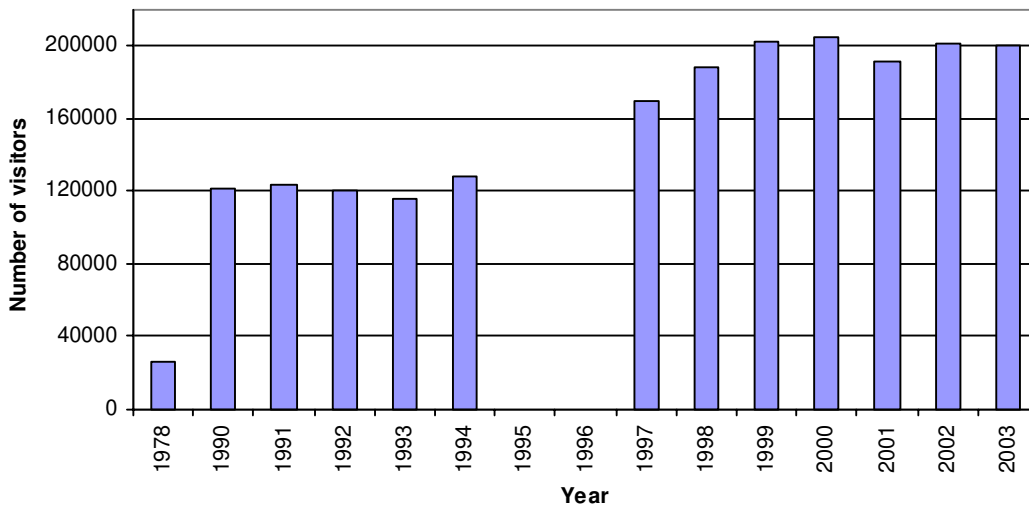
Photos: A. Smith

Walpole town site has also had an increase in development since the opening of the Tree Top Walk in 1996. There has been an increase in accommodation and new local tour operators, shops, a new bank (Bendigo Bank), an expanded Health Care Centre, new art gallery, new attractions including a parrot and reptile park, new eateries/restaurants and various roads have been upgraded such as the road to Bow Bridge which was upgraded due to increased traffic and visitation (CALM 2004g).

Current Recreation Use and Management

There were a relatively constant number of visitors to the Valley of the Giants area prior to the development of the Tree Top Walk. Visitor numbers prior to 1990 are not available and figures from 1978 are estimates only. The mean visitor numbers from 1990 to 1994 was 121,894 (Figure 44). The site was closed in 1995/96 hence the absence of visitor numbers. An initial increase in visitation was recorded after the opening of the Tree Top Walk. Visitor numbers levelled and have remained relatively constant with a mean of 200,134 visitors from 1999 to 2003 representing a 39% increase in visitation (Figure 44). The drop in visitor numbers in 2001 was in accordance with an overall drop in visitor numbers to the Southwest for that year probably due to the compounded impact of September 11 and the collapse of Ansett Airlines (WATC 2002a).

Figure 44: Annual visits to Tree Top Walk (1978 to 2003)

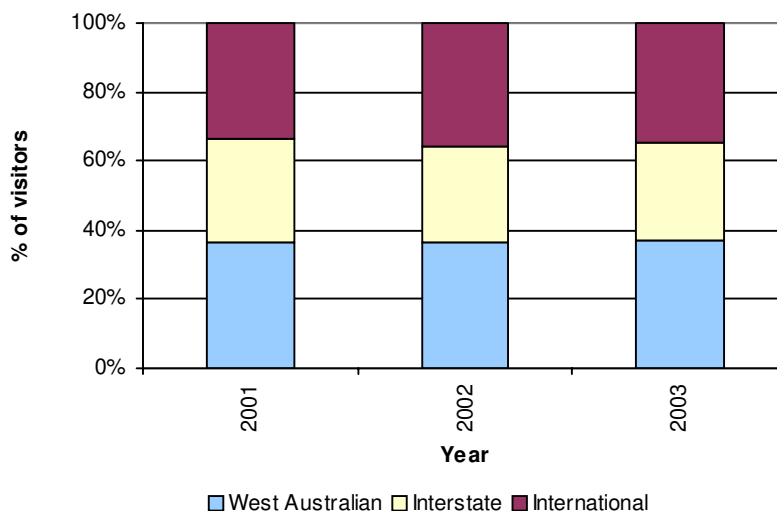


*1995/96 Site closed for redevelopment

Source: CALM VISTAT (CALM unpub.-b)

Data in relation to the place of origin of visitors is only available from 2000. This data was collected at the Tree Top Walk by asking visitors their postcode on purchasing an admission ticket. The international, West Australian and interstate market have remained relatively constant since 2000 (Figure 45). All three markets are relatively evenly represented. The international market represents a mean of 35% of visitors (Figure 45). A survey conducted by Hughes (2003) showed slightly different figures with 41% (preliminary survey, N = 385) and 42% (principal survey, N = 261) of respondents from Western Australia, 35% (preliminary) 21% (principal) from interstate and 17% (preliminary) 36% (principal) were from overseas. CALM surveys showed 34% (2001), 43% (2003) of respondents were Western Australian, 31% (2001), 57% (2003) were from interstate and 36% (2001), 34% (2003) were from overseas (CALM 2001, unpub. 2003b).

Figure 45: Annual visits by Western Australian, interstate and international visitors to Tree Top Walk (2000 to 2003)

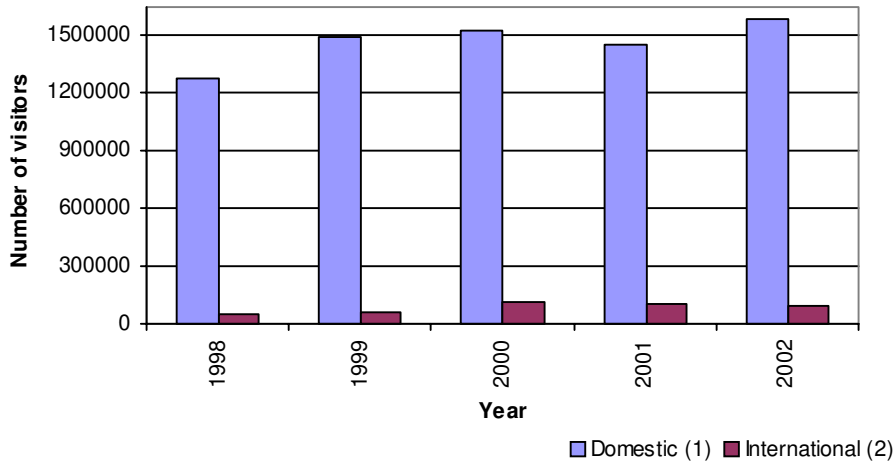


Source: CALM VISTAT (CALM unpub.-b)

These figures are in contrast with research conducted by the West Australian Tourism Commission that shows that on average 5% of total visitors to the Southwest region are international visitors (Figure 46). This contrast suggests that a high percentage of international visitors to the southwest region are visiting the Tree Top Walk and could be due in part to the Valley of the Giants being promoted as one of the Western Australian Tourism Commission 'must see attractions' of Western Australia. It has featured in two international advertising campaigns including the WATC's multi-million dollar advertising campaign featuring supermodel Elle McPherson (CALM 2004g). Additionally, in 2001, Olympian basketball player Luc Longley, carried the

Olympic Torch over the 40 metre high spans and on New Year’s Eve for the new millennium a Lantern Walk was conducted through Tree Top Walk which was covered on ABC worldwide television coverage and promoted as a national icon (CALM 2004g). There has also been an increase in the number of tour operators, since 1996 there has been an increase of more than 120% of CALM licensed tourism operators to visit Walpole-Nornalup National Park, with 125 licensed tour operators in 2003 (CALM 2004g).

Figure 46: Annual visits to the Southwest Region (1998 to 2002)



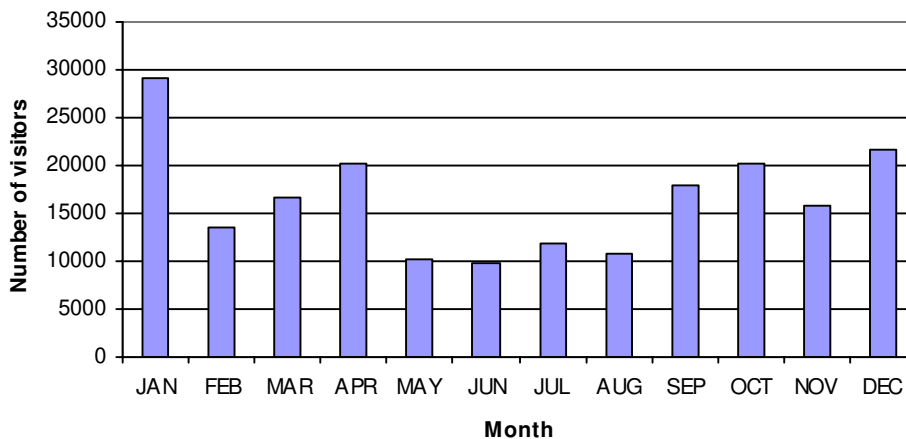
Note: Domestic (1) = Australian residents aged 15yrs and over who spent at least one night away from home in Western Australia; International (2) = International visitors aged 15yrs and over who spent at least one night in the region.

Source: WATC (2002b)

Increasing visitor numbers are of limited concern to managers, rather it is the reduction in repeat visitors that are of more concern. Interviewees stated that there has been a reduction in the percentage of Western Australians visiting the site. The current financial plan is looking at attracting repeat Western Australian visitors. Several strategies have been considered including: a nocturnal house and including an extra loop of the Tree Top Walk. Interviewees stated that managers are not exactly sure how many visitors in the future the site could sustain. It was estimated that an additional 10% to 20% (20,000 to 40,000 visitors) per annum could be sustained at the current level of development without impacting on the site or affecting the quality of the visitor experience. This increase would however need to be spread out throughout the year and not at peak times.

Monthly visitor figures over a three-year period (2000 to 2003) were averaged (Figure 47). Distinct peak periods occur during the Western Australian summer school holidays (December and January), April, which coincides with the Easter break and Western Australian school holidays, and September and October which is the wildflower season. The lowest visitation occurs in the cooler winter months (May to August) (Figure 47).

Figure 47: Average monthly visits to Tree Top Walk (2000-2002)



Source: CALM VISTAT (CALM unpub.-b)

Interviewees stated that peak periods can have some impact on visitation. It was stated that international visitors are more likely to visit during the summer months, with interstate visitors coming in September and October. Visitors from Singapore are more likely to visit in June, which coincides with their school holidays. This spread of visitors helps to balance the potential impact on visitation experience. Interviewees also stated that there is some difficulty managing international visitors because it is felt that they often have a different outlook as they generally live in a more built up living environment with only limited access to natural area.

In order to provide a high standard in customer service several monitoring strategies are undertaken. Customer comment cards have been distributed since 1999 and there is also a visitor book available for comments. Comments from 2003 (N = 125) and 2004 (N = 61) are positive. A majority of respondents in both surveys commented that their trip to the Tree Top Walk, service provided by staff, information provided and cleanliness and maintenance of the facilities was very enjoyable/excellent (CALM unpub. 2003a, unpub. 2004).

Visitor surveys have also been conducted on-site in both a formal and informal manner (CALM 2004g). The Walpole-Nornalup National Park Visitor Survey Program (CALM 2000b, 2001) was conducted from February to April 2000 and December 2000 to April 2001. The response rates were however very low. The 2000 survey had only 12 respondents. Due to the low sample size this survey is a non-representative sample and therefore will not be discussed in further detail. The 2001 survey had only 40 respondents. This survey will be considered as a guideline only to be compared with other studies.

In October 1999, a preliminary study (N = 385) was conducted to gather visitor characteristics and reasons for visiting the Tree Top Walk (Hughes 2003). A further survey (principal survey, N = 261) was conducted in January, February and December 2001 and March 2002. This survey examined visitor attitudes to a modified natural attraction, focusing on whether the site delivered benefits associated with traditional ecotourism (Hughes 2003; Hughes & Morrison-Saunders 2003). A majority of respondents from both surveys were first time visitors, visiting with family or a partner (68% preliminary 65% principal) or friends (26% preliminary, 30%) (Hughes 2003). There was a 53:47 (preliminary), 57:43 (principal) female to male ratio with the majority of respondents aged 25 to 39 (31% preliminary, 36% principal), 40 to 59 (34% preliminary, 27% principal), and 60+ (23% preliminary, 17% principal). It was felt that this was a reflection of the family orientation of the site (Hughes 2003).

Data from source visitation analysis was conducted in the 2002/03 financial year. This survey showed that the majority of respondents (N = 50) were also first time visitors (CALM unpub. 2003b). The Tree Top Walk was generally part of a multi-destination trip. Similarly, the majority of respondents were visiting with family or a partner with a group size of one (28% of respondents), two (26% of respondents) or four persons (26% of respondents) (CALM unpub. 2003b). CALM's visitor survey program also found that a majority of respondents were first time visitors, aged 40 to 59 years (38%) and 25 to 39 years (31%), with a 55:45 female to male ratio (CALM 2001).

Hughes (2003) found that the most frequent reasons for visitation related to natural aspects including reference to the Tingle trees, forest and/or wildlife seen during the experience and the most remembered aspect of the site was the Tree Top Walk structure and the trees (Hughes 2003). Data source analysis found that a majority of respondents were visiting the region for leisure/holiday/recreation purposes. Respondents main reasons for visiting the region were holiday (32%), tourism/sightseeing (30%) and Valley of the Giants/Tree Top Walk/Tingles (20%) (CALM unpub. 2003b). The CALM visitor survey program also found that the main purpose of visit was seeing giant Tingle and sightseeing/holiday (CALM 2001).

Data source analysis (N = 60) asked visitors 'Had you known that the Valley of the Giants site was closed prior to embarking on your trip, would you have still visited the Manjimup/Walpole/Denmark region?' The majority of respondents (60%) indicated that they would have still visited the region (CALM unpub. 2003b). Fifty-six percent of respondents also said that they intended to return to the Valley of Giants because of the 'amazing experience' (22%) and the 'unique place' (18%) (CALM unpub. 2003b). Eighty-six percent of respondents visited the region by car with 8% visiting by tour bus (CALM unpub. 2003b).

Interviewees stated that crowding and visitor conflict was of limited concern. The site has been developed to ensure only short stay visits. Generally, visitors stay at the site for 40 minutes to an hour. If people were encouraged to stay longer then additional infrastructure would need to be included. This would increase the area of impact, as facilities such as additional car parks would also need to be provided.

In order to alleviate visitor pressure in peak periods but also to value add the visitor experience, holiday activities are held in summer, Easter and September school holidays (CALM 2004g). Activities include: guided nature walks, walks under the Tree Top Walk structure, guided spotlighting walks, and wildlife rescue talks. Additionally, local tour operators have also been included in the holiday programs since 1999 (CALM 2004g). These activities are promoted in dedicated brochures that are distributed via retailers in the region including tourist bureaus and accommodation houses. The programs allow registered operators to be marketed and provide appropriate tourism services in conjunction with the Valley of the Giants and other tourism businesses to provide a quality sustainable product (CALM 2004g).

There have been few issues with the design of the site that managers have had to accommodate. The overall impact on the environment is considered low. In 2002, boardwalk was relocated in the Ancient Empire Walk after it was realised that trees located close to the edges were being touched too often. While some of the existing

boardwalk is close to some trees, these trees are seen ‘sacrificial’ and visitors are discouraged to touch trees. This factor was considered and built in at the design stage of the Ancient Empire Walk. Additionally, managing risk is an important aspect of ongoing maintenance. Regular pruning of branches located close to the Tree Top Walk is conducted to reduce risk to visitors as the tingle has a tendency to drop limbs. Also, engineering services are contracted biannually to evaluate the walkway as part of risk management.

Another management issue that needs to be considered is the presence of litter at the site. There is a ‘no bin’ policy at the site. This encourages visitors to take all litter off-site. Visitors who enquire about the rubbish policy are issued with a complimentary Keep Australia Beautiful rubbish bag (CALM 2004g). In general, interviewees stated that managers experience occasional problems from visitors in regards to litter, which consist of small items such as cigarettes and chewing gum. To alleviate this problem staff walk around the Tree Top Walk base and Ancient Empire Walk once per day to pick up rubbish and also provide general site maintenance to improve visual and operational aspects of the site. Often there are only limited amounts of rubbish although things accidentally go over the side of the elevated platform such as car keys, hats, jumpers, cameras and sunglasses. These are retrieved and placed in lost property.

Interviewees felt that visitors were typically generalists. At present the site offers only minimal interpretation (Figure 48). In the development process it was suggested that the site would speak for itself. In addition to static displays, staff are posted around the Tree Top Walk at peak times to give additional information. Visitors however have expressed a desire to know more about the forest and how the structure was built. Tour coach visitors are offered additional interpretation and are greeted by CALM staff and given an introductory presentation (CALM 2004g). Coach visitors are giving priority access to the walkway in peak times to ensure operators keep on schedule (CALM 2004g). Tour coach operators also have a fairly good general knowledge of the Tree Top Walk and provide additional information to their clients. As a result of the desire for greater interpretation, a visitor centre is currently being planned – the Wilderness Discovery Centre. Interviewees stated that this centre will be centred on the theme of the unique tingle forest and will include information about construction of the Tree Top Walk. Entry will be repositioned so that access to the Tree Top Walk will be through the visitor centre.

Figure 48: Examples of static displays located at the Tree Top Walk



The Tingle forest canopy is a living shield protecting the ancient community of plants and animals within. Dead branches protrude above the greenery, like fingers of giants reaching towards the sky, reminders of past wildfires that threatened this cool temperate forest. The larger Tingle trees are over 400 years old.



A variety of furred animals live within the Tingle Forest. Most are nocturnal and secretive. The Quenda and Quokka forage at night on the forest floor. The Brush-tailed Possum, Wambenger and bats shelter in tree hollows during the day.

Photos: A. Smith

A study conducted in 1999 and 2001 at Tree Top Walk, examined the impact of trail-side signs on visitor knowledge (Hughes 2003; Hughes & Morrison-Saunders 2002). Respondents expressed frustration with the minimal approach to interpretive signs at the Tree Top Walk and wanted more signs installed along the walk trails despite the presence of information displays around the visitor kiosk (Hughes & Morrison-Saunders 2002). In response to this, additional signs were installed. There appeared to be a positive increase in the perception of the site as providing a learning experience even though no additional improvement of visitor knowledge was recorded (Hughes & Morrison-Saunders 2002). The addition of trail-side interpretive signs were also found to provide a point of interest for repeat visitors already familiar with the unique experience of the Tree Top Walk (Hughes & Morrison-Saunders 2002). The results from this study illustrated the need for provision of new experiences or points of focus at natural area attractions (Hughes & Morrison-Saunders 2002).

Interviewees stated that the Tree Top Walk has been a success in ameliorating impacts. Ongoing ecological assessment studies reveal that despite the increase in visitor numbers the health of the Valley of the Giants has improved since the redevelopment of the area (CALM 2004g). The success of the Valley in achieving sustainability was verified when it achieved ecotourism accreditation under the National Ecotourism

Accreditation Program (NEAP) in 1998 (CALM 2004g). Staff have been involved in a variety of monitoring and rehabilitation programmes since the opening of the Tree Top Walk which include: recording bird species and numbers in the area; the Valley is a site for biannual surveys of owls; major revegetation programmes have been undertaken including the relocation of 3,200 sword grass (*Lepidosperma effusum*) in one year; baiting against the feral fox; following the success of the baiting program, CALM re-established a population of woylies (*Bettongia penicillata*) in the Valley with 42 being released in March 1999; these animals are currently the subject of a comprehensive monitoring programme involving trapping and spotlight observation (CALM 2004g). Interviewees also stated that during night walks brush-tailed phascogales (*Phascogale tapoatafa*), southern brown bandicoots (*Isodon obesulus*), brush-tailed possums (*Trichosurus vulpecular*) and the specially protected quokka (*Setonix brachyurus*) are regularly seen.

Interviewees commented that while environmental impacts may be a future concern and something to be aware of, at present this is not an issue as there are very limited impacts. The primary concern in managing the Tree Top Walk is sustaining the experience, environmentally and experientially. The ongoing goal is to develop innovative ways to encourage return visits and to pass on the environmental message.

At both Monkey Mia and the Tree Top Walk increasing visitor numbers were not an immediate concern. Generally visitors to both sites are predominantly first time visitors on a multi-destination trip. Visitors to these sites are most likely to visit in family groups or with friends of two to four persons aged in the 25 to 49 year age bracket. In both surveys there were a higher proportion of females to males. At Monkey Mia, the majority of respondents are from overseas and Western Australia with the lowest proportion from interstate. In contrast, at Tree Top Walk, the proportion of overseas, Western Australian and interstate visitors was fairly even.

Respondents were most likely to travel to the respective regions in passenger vehicles and generally stay for short visits (less than a week). The main attraction for respondents was the natural area attraction, i.e. dolphins at Monkey Mia and the Tingle forest/Tree Top Walk at Valley of the Giants.

In summary, Tree Top Walk has a long history of visitation. Increasing popularity of the site resulted in negative environmental impacts occurring. Management responded by developing the site, changing the setting from a roaded natural site, that appeared predominantly natural, to a highly developed one, where the site was dominated by the modification, although still with a natural background and theme. The main attraction of the area is still its natural features although the facility has also become an attraction. As a result of the development of Tree Top Walk and additional increasing visitation to the region, other natural attractions in the region have also experienced increasing levels of development. Crowding and visitor conflict was of limited concern at Tree Top Walk due to the short stay nature and design of the site. Additionally, the site was considered a success in ameliorating impacts and monitoring indicates that the health of the Valley of the Giants has improved despite increasing visitor numbers.

Visitors were generally first time visitors on a multi-destination trip travelling to the region via car. Survey data showed that respondents were most likely to visit Tree Top Walk with family or a partner, in a group of one to four people aged in the 40 to 59 year age bracket with a higher proportion of females to males. Tree Top Walk attracts a higher proportion of international visitors than the rest of the southwest region (5% international visitors to southwest: 35% international visitors to Tree Top Walk).

Chapter 5

CONCLUDING PERSPECTIVES

What the Case Studies from Western Australia Tell Us About Impact Creep

The two case studies highlight the complicated process involved in impact creep. They further show that the development of some facilities has reduced the level of negative environmental impact, however, this has resulted in a change to the visitor profile with the proportion of Western Australian visitors declining. Further, the case studies show that development at high use sites also has the potential to influence visitation to other natural areas in the region creating a situation of increased development in the entire region. In regards to the social impact, the full extent is not understood because this study did not have sufficient time to determine the impact of visitor displacement, loss of sense of place, perceived loss of natural values and changes in visitor experience.

Both sites have a history of increasing visitation that has raised the level of environmental impacts and the potential for further impacts. This necessitated management response and the resultant management actions have resulted in a reduction in negative environmental impacts through site hardening and associated developments. The resultant development in turn appears to have contributed to an increased attractiveness for a wider visitor profile but may have displaced those seeking a more primitive experience. The difference between the two study sites is that Monkey Mia is substantially centred on a dolphin-feeding program. This feeding program has become extremely popular with domestic and international tourists. Marketing in the international arena has in turn contributed to the crowding conflicts at Monkey Mia, which is of concern due to the concentrated nature of the area where the interaction occurs. At Tree Top Walk this is less of an issue because visitors are dispersed over a larger area and short stays are encouraged through the design of the walk platforms. Additionally, use is limited because no more than 25 people are allowed per span on the Tree Top Walk which limits the potential for crowding as opposed to 200 people congregating in a 150 m stretch of beach at Monkey Mia.

Upgraded access at Monkey Mia that facilitated the entry of 2WD and tour coaches created a situation where more people could visit the site. Various developments at Monkey Mia have been put in place in order to service the increased demand and/or manage greater numbers of visitors. This in turn has helped to place increased pressure on the interaction area, which is confined to a small area that cannot easily be changed. At present 150 more beds are planned for the resort, which of course means more people. In the context of Monkey Mia, impact creep might be deemed acceptable providing it can sustain the number of visitors in terms of maintaining natural values, minimising impacts and maintaining visitor satisfaction. This issue was highlighted when the normal visitor numbers increased by 300 at one feed which resulted in an increase in the number of complaints to CALM staff and pressures on the staff themselves. Of interest is that the visitor survey indicated that development was not a reason for visiting Monkey Mia and the facilities at Monkey Mia either had no influence or did not necessarily add to the quality of their experience.

The issues of potential overcrowding and increasing development at Monkey Mia are experienced at other sites where wildlife is observed in a restricted viewing area. For example, penguins and seals at Phillip Island Nature Park in Victoria, sea lions at Seal Bay, Kangaroo Island in South Australia and dolphin provisioning at Tangalooma in Queensland. If development is to continue at Monkey Mia it may face a situation such as that experienced at Phillip Island, Victoria. Bulbeck (2005) reported that the little penguin viewing situation at Phillip Island was once an experience where visitors would gather on the beach with a torch to view the penguin parade in relative solitude. In the 1980s government funding in response to concerns over declining penguin numbers allowed the construction of boardwalks across the dunes, an elaborate visitor interpretation centre that incorporated a cafeteria, shop and sophisticated displays and a viewing structure which seats approximately 3,000 people. In 1995 there were over 500,000 visitors with a high proportion of international visitors. Bulbeck (2005) reported the least enjoyable aspects of the visit included crowds pushing and blocking the view. Visitor comments regarding the beach area included 'it was like a concentration camp, all the lights and fences.....We're the guards watching the prisoners come up'. Locals commented on the change of the experience 'When I was a kid, it was just beach and bush....Now the whole thing is totally gross, really'. (Bulbeck 2005)

The situation at Monkey Mia also provides direction for less developed sites such as little penguins at Kangaroo Island, South Australia, sea lion viewing at Carnac Island, Western Australia, turtle viewing at Exmouth, Western Australia and stingray tourism at Hamelin Bay in Western Australia. These sites may benefit from the information provided and alternatives may be considered to large-scale development with increasing popularity of the sites. These sites are currently experiencing pressure to develop. The Jurabi Turtle Centre was opened in 2004 north-west of Exmouth and there are pressures to increase the size of the pontoon at Carnac Island to accommodate larger tourist vessels.

Lewis and Newsome (2003) examined stingray tourism at Hamelin Bay in southwest Western Australia where up to 16 large stingrays (*Dasyatis brevicaudata* and *Dasyatis thetidis*) and numerous eaglerays (*Myliobatis australis*) are fed by up to 20 visitors per day at the waters edge. The site at present has no interpretation, management presence or development specifically designed to control visitors. This site is similar to the situation in the early days of Monkey Mia where there was no regulation of feeding, the site is located close to a caravan park and the occurrence of the feeding situation is currently spread by word of mouth. This study showed that there is significant interest from tour operators in developing stingray tourism at this site with visitors acknowledging that the site needs management through ranger presence and controlled feeding, more signs, information and a management plan. A popular phrase by a quarter of respondents was that they wanted 'no commercialisation/leave as is' and 'no Monkey Mia'. Similar phrases regarding Shark Bay not becoming too commercialised were reported at Monkey Mia by 26% of respondents in 1988 (WATC 1988). This information was disregarded along with advice from CALM to not develop the site, however, due to political and economic pressures development went ahead. (Lewis & Newsome 2003)

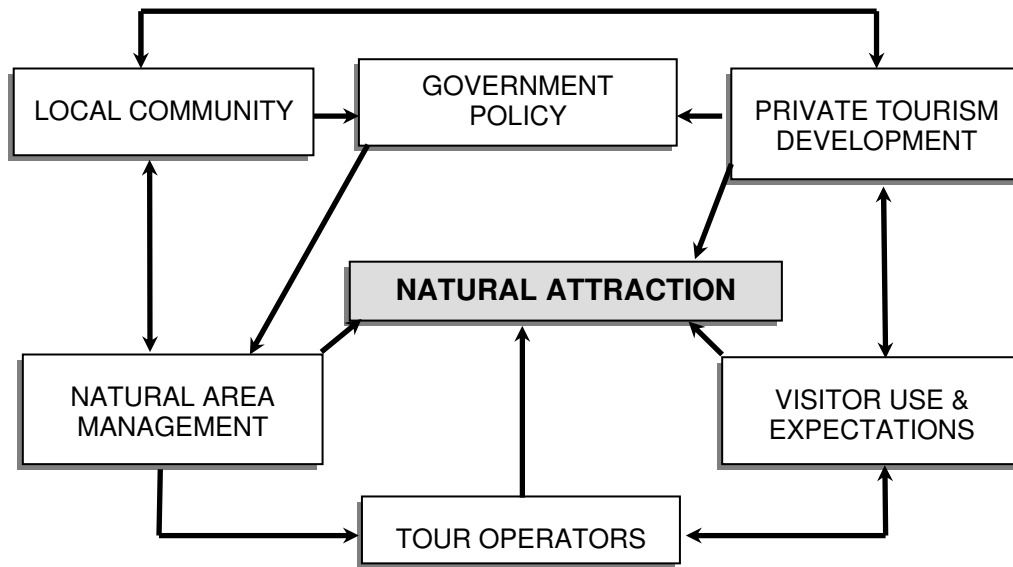
A major difference between the two case studies is that they have been the subjects of different policy directives. Tree Top Walk was developed under a management plan that had clear guidelines. Monkey Mia had no management plan and unsecured tenure (joint vesting occurred at the time of development). When accommodation facilities were developed CALM recommendations were ignored in favour for economic returns and political pressure. Monkey Mia also has a more complex land management issue due to the situation of joint management with the Shire. A significant difference between the two sites is that Tree Top Walk has no accommodation facility so the visitation period is short. Monkey Mia has accommodation which means that limiting visitor use is problematic because as many as 600 people stay in the vicinity of the interaction area overnight.

Further, the case studies show that there were further reaching implications than just the site being developed. Other recreation sites in the region were also developed in response to increasing visitor pressure at sites that previously received lower visitor numbers. An increase in developed sites has the potential to create a situation where the entire region is more highly developed. This increases pressure on any remaining primitive sites in the region as those seeking a primitive experience are displaced from sites they may have previously visited and are restricted to a choice of fewer areas. This creates a situation of increasing visitor pressure at sites that may have previously had very little visitation and/or impact. The increased development of any additional sites therefore reduces the diversity of opportunities available to visitors. Further, while some visitors may be displaced from the more developed sites, others will replace them therefore not reducing visitor pressure but merely changing the visitor profile.

Management of Impact Creep

Impact creep is a complex situation because it confers both negative and positive impacts. It is also likely to vary in detail according to different tourism situations and attractions. The general trend is that as more people are attracted to a site the higher the probability of the process of impact creep occurring. Development is favoured because it solves the original problem of increasing impact in the short term but in the long run the impact situation may resurface although probably in a different form. McCool (2001) highlighted the need for managers to ask 'what are the appropriate or acceptable conditions for this area, given its regional context and legislative mandate?' He went on to further clarify the importance for managers to explicitly identify what goals they are seeking, recognising that tradeoffs occur, and identifying the rationale for those tradeoffs. Figure 49 represents all of the interests that can have a stake in a natural attraction. It is important to realise that in different situations, varying interests will exert stronger or weaker influences. For example, some situations may have weak government policy directing the regulation of the natural area. In other cases, private tourism development may be stronger because they are economic drivers for the development of a particular region that offer employment and business opportunities. Some sites have more local community interests than others. In some situations there may be tour operators that are highly motivated in minimising impacts, while in other situations operations are driven by economic return with less regard to impact. Some natural area managers have more funding at their disposal to manage a site than in other situations. Remote locations may have only limited management presence. Visitor use may be driven by the attractiveness and popularity of the site, which is influenced by marketing, and in some, cases the level of facility development (McCool 2001). (McCool 2001)

Figure 49: Conceptual diagram representing how impact creep may be driven by various interests



Each impact creep situation may be deemed unique but within each situation one or more of the following scenarios may be considered in deciding how to respond to existing impacts, threatening processes, increasing visitation, tour operator interests and pressure for commercial development.

Maintain at the Current Level

Maintenance at the existing level of visitation is dependent on adequate management of impacts and the continuance of a high level of visitor satisfaction. Management of larger numbers at Monkey Mia has involved preventing clients from touching the dolphins, keeping people only knee deep in the water during an interaction, regulating who feeds the dolphins, restriction of swimming near the dolphins, provision of educational talks and the addition of more staff to manage the situation. The central issue is determination of an end point to impact creep. At Monkey Mia the implications of a further increase in visitation are the possible effects on animal welfare, a potential for deterioration in visitor satisfaction, negative impacts on the surrounding environment and additional impact creep. The end point should therefore be determined by regular visitor surveys on satisfaction in regards to the overall experience, including presence of infrastructure, not just the dolphin interaction. Further the visitor profile should be examined to determine any major shifts in trend which would be an indicator of visitor succession. Any decline in viability of the attraction and any evidence that indicates emerging impacts on the attraction or surrounding environment. Any negative trends can then be used as an argument for stabilising the attraction at current use levels either by dispersal of activities or restrictions on use or a combination of both.

Benfield (2001) describes the process of stabilising visitor access at a very popular cultural and garden attraction in England. The National Trust property of Sissinghurst Castle and its gardens were opened to the public in 1967 and the number of visits increased from 28,000 to 67,000. The owners initiated a programme of site hardening and rehabilitation in order to cope with the increase in visitation. This was followed by the provision of a food outlet and gift shop. The 1986 open season showed 140,000 visitors and by 1989 visitation stood at 166,000. Castle management noted that there was no sign of visitation levelling off and the facilities were becoming overcrowded. This resulted in delays, queuing and trampling of the gardens that people had come to see. Sissinghurst Castle Management established a carrying capacity of 400 people at a time for the gardens. Self-regulation did not work and a timed entry system was introduced in that once garden capacity was reached then visitors were given a time at which they would be able to access the gardens. In order that visitors had something to do while waiting they were directed to displays and dioramas of garden history and other exhibits. The presence of a gift shop and restaurant also helped to offset any negative feelings about the wait time. The arrival of coaches with up to 60 clients at a time was managed through a tour bus booking system. A mail campaign aimed at all tour operators using the facility helped to set up tour bus arrivals at a agreed time thus avoiding long wait times and overcrowding at the Castle. Benfield (2001) reports that these changes have created a more sustainable situation in reducing impacts and overcrowding that will in turn lead to greater client satisfaction.

In the case of Tree Top Walk access is already controlled because no more than 25 visitors per span is

allowed. Increased visitation at this site can be sustained due to the design of site in restricting access and minimising impacts. Moreover the provision of a visitor centre can help to attract more visitors and enable them to occupy time usefully should there be a delay in gaining access to the walkway itself.

Dispersal of Activities

Dispersal of activities can centre on two main themes. The first involves dispersal within vicinity of the attraction (Cole, Petersen & Lucas 1987; Hammitt & Cole 1998; Lucas 1990a; Washburne & Cole 1983). An attraction that has undergone impact creep may have a visitor centre, nearby subsidiary attractions that are related to the main attraction, retail and food outlets. Such features temporarily help to focus attention away from the main attraction during busy periods and during wait times if restrictions are operating. The second approach to managing issues surrounding impact creep is through the use of designated sites that are located beyond the main attraction. Such sites might include walk/nature trails, bird hides and interpretive geotourism sites.

Designated Impact Creep Sites

In addition to this planning frameworks, such as the Recreation Opportunity Spectrum (ROS), can be used to concentrate impact creep at a few sites so that other, less developed, experiences can then be offered at other sites. Sites that are designated as potential impact creep zones can serve to concentrate use into a single area. Other areas within a park can then be developed to a lesser extent ensuring that visitors are dispersed and pressures reduced on individual sites (Hammitt & Cole 1998; Newsome et al. 2002; Smith 2003). This can help to provide a suite of recreation opportunities ranging from concentration of activities at highly developed sites through to areas where the overall authentic natural experience is maintained.

Designation of areas for facility development (impact creep) helps to focus management in a few but highly managed areas. For example, currently in the southwest of Western Australia there are forest areas where there are widespread and dispersed camping activities in informal areas that are mostly accessible by 4WD vehicles via fire control management tracks or other unsurfaced roads. These sites have been developed by users not managers, are not marked by signs and facilities are not provided (Smith 1998, 2003). The study conducted by Smith (2003) showed that areas where camping activity was concentrated in designated areas with facilities had significantly less impact than informal dispersed campsites. Use that is restricted in designated sites has been shown to limit the areal extent of resource disturbance with the additional benefit of increasing the efficiency of maintenance and visitor contact/enforcement activities (Leung & Marion 2000a; Marion & Farrell 2002; Smith 2003).

Limits on Use

Limiting usage can help to stabilise and maintain the attraction. Manning (2004) identifies the use of fees, use of permits, restrictions on the number of visitors and/or restrictions on length of stay as strategies to deal with increasing visitor pressures. The benefits and potential problems associated with these approaches are summarised in Table 14. Some researchers have considered restrictions on the use of an area to be the last resort as it contradicts the objectives of many national park and natural area management plans (Dustin & McAvoy 1980; Hendee & Lucas 1973). It is, however, recognised that such actions may be necessary in order to maintain sustainability of the site and visitor experiences (Manning 2004).

From Table 14 it is evident that where use/access restrictions, in the form of a reservation or permit system, have been applied there is generally high public acceptance, maintenance of visitor experience and control of negative impacts.

Table 14: Advantages and disadvantages of use rationing as a means of controlling visitor use at popular tourist sites

Strategy	Advantages	Disadvantages
Reservation/permit system	Benefits clients who can plan ahead. Utilised in the US parks and forests with general high acceptance by the public. Impacts can be controlled by reducing visitor numbers and controlling the distribution of visitors in time and space. Value of the experience is maintained.	Potential problem for people whose lifestyle or arrangements not being conducive to long-term planning. Under utilisation can occur because of people not turning up. Usually requires additional resources and staffing to administer the booking/permit system. May displace some types of visitors.
First come, first served arrival system	Favours clients who have accommodation nearby or who have plenty of time. Reduces visitor numbers and can be used to control the distribution of visitors in time and space.	Disadvantage for those with little time or who have to travel some distance to the site. Low-moderate acceptance by users. Management may need to develop a control facility.
Introduction of or increase in existing fees	Advantage for those willing to pay. Could be an efficient way to control visitor numbers as clients have to assess the financial worth of the experience they are seeking.	Arises as a problem for clients who are unable or do not want to pay. Entrance fees are generally not used to limit use of an area. Low-moderate acceptability.

Derived from Manning (2004)

The study described by Benfield (2001) provides a useful practical example of how an increasingly popular site became under pressure with management using timed access as a means of controlling numbers, thereby reducing impacts and increasing the likelihood of visitor satisfaction.

Chapter 6

GENERAL CONCLUSION

This study has defined and contributed to the knowledge of impact creep. To bring the study to a close the major objectives are re-visited below.

To Define and Explore the Nature of Impact Creep

Impact creep can be defined as a sequence of changes that lead to a site being more developed. These changes confer both negative and positive impacts. Each impact creep situation may be deemed unique according to different tourism situations and attractions.

To Understand Impact Creep in the Context of Two Contrasting Case Studies

Both Tree Top Walk and Monkey Mia have a history of increasing visitation which has increased the potential for further impacts. Management has responded accordingly and the resultant actions have reduced negative environmental impacts through site hardening and associated developments. The resultant development in turn appears to have contributed to an increased attractiveness for a wider visitor profile. The Monkey Mia survey revealed that visitors generally prefer natural landscapes with limited facilities but the facilities provided were not seen as being detractive and had no influence on the quality of the visit. Moreover, facilities may be considered as a positive influence because of the convenience they offer.

A major difference between the two case studies is that impact creep has occurred according to different policy directives. Tree Top Walk was developed under a management plan that had clear guidelines. Monkey Mia had no management plan and joint management with the Shire of Shark Bay. When accommodation facilities were developed at Monkey Mia CALM recommendations were ignored in favour for economic returns and political pressure. A notable difference between the two sites, therefore, is that Tree Top Walk has no accommodation facility so the visitation period is short while Monkey Mia has accommodation which means that limiting visitor use is problematic because as many as 600 people stay in the vicinity of the interaction area overnight.

To Provide a Management Perspective on Impact Creep

Several potential management strategies can be applied in any particular impact creep situation. At Tree Top Walk a dispersal strategy in the form of a visitor centre may help to focus attention away from the main attraction during busy periods and during wait times if restrictions are operating due to heavy demand. Because of the potential for increased visitation, crowding, conflicts and reduced visitor satisfaction at Monkey Mia limitations on use may have to be applied. Previous work has shown that use/access restrictions, in the form of a reservation or permit system, may be the best approach.

Suggestions for Further Research

The two case studies presented in this report give rise to several avenues of further research. The first avenue involves an exploration of the question as to why limiting use has not been applied at Monkey Mia? Additional comparative studies that explore politico-social, cultural and environmental differences and similarities to sites such as Monkey Mia will help us to understand such situations further. A suitable comparative study could include the Phillip Island penguin Parade where the creep process has extended to a form beyond that currently seen at monkey Mia. Following on from this and particularly applicable to the Tree Top Walk facility in Western Australia is the question as to why site hardening has been a favoured visitor management strategy. There are no doubt good reasons as to why both Monkey Mai and the Tree Top Walk have evolved in the way they have but the process of change over time (impact creep) needs to be understood better in the wider Australian context.

A recent paper by Mason (2005) raises the question of visitor management utilising 'hard' and 'soft' approaches. Hard approaches strongly relate to the concept of impact creep where visitor management is in the form of site hardening. Soft approaches entail and rely more on interpretive programmes and visitor adherence to codes of conduct as management strategies. Mason (2005) identifies the lack of data on the relative importance and effectiveness of hard versus soft approaches at particular sites.

The work presented in this report requires extension in order to gain a deeper insight into visitor perspectives on what management styles ('hard' and 'soft' approaches) are acceptable in natural areas and to ascertain at what stage certain groups/types of visitors become displaced due to on-site hardening and/or facility development.

Concurrent with this would be additional data collection on what the main driving force is in the management decision-making process in choosing to harden a particular site. Connected with this is the managerial perspective on the relative utility and effectiveness of 'hard' versus 'soft' approaches. Further case studies are also required in order to explore how hard approaches and impact creep might lead to new tourism facility proposals and subsequent government approval of developments such as tourist resorts.

Mason (2005) notes the case of New Zealand where it has been found that, in remote locations, domestic tourists had different requirements to international tourists. Of significance here is the observation that impacts arising from the two groups were different thus potentially requiring different management responses that may in turn lead to different impact creep scenarios. Connected with this is the important question of whether site hardening makes an attraction more appealing to certain/more types of tourists and how can different types of tourists be targeted for soft visitor management approaches such as interpretation and adherence to codes of conduct? Moreover, at what stage (or what is the main controlling factor) does the evolving site become more attractive to developers who may wish to submit proposals for accommodation and/or other facilities?

Is it inevitable that all the major natural attractions, (and especially wildlife), in a particular area will become high use and developed over time? Alternatives to impact creep and over development need to be explored at the regional level in Australia. The viability and relative success of soft versus hard visitor management approaches requires further study especially where the management preference and societies choice would be to 'develop' and maintain a variety of nature based experiences in the more remote parts of Australia.

In addition to the suggestions for further research mentioned above, the impact creep work also needs to be extended to resource corridors such as access trails. Access trail 'carrying capacity' needs to be explored in the context of diverse user pressures on protected areas. There is now pressure for natural area managers to accommodate user specific (hiking, ORV, bridle and mountain bike) trails. There is the risk of resource access corridor creep along with attendant impacts and the need for management response. Guiding principles need to be developed to assist in the planning and management of spatial networks of various trails based on assessment of existing resource conditions, impact potential and the need for management action.

APPENDIX A: LIST OF INTERVIEWEES

NAME	OCCUPATION
Mr Wayne Schmidt	Program Coordinator Parks, Recreation, Planning & Tourism Division Department of Conservation and Land Management Como, Western Australia
Mr David Charles	Manager Monkey Mia Reserve Department of Conservation and Land Management Denham, Western Australia
Mr Trevor Burslem	Manager Valley of the Giants, Tree Top Walk Department of Conservation and Land Management Nornalup, Western Australia
Mr Cliff Winfield	Manager Parks and Visitor Services Southern Forest Region Department of Conservation and Land Management Manjimup, Western Australia

APPENDIX B: MANAGEMENT INTERVIEW QUESTIONS

This project aims to explore the causes, extent and public acceptance of impact creep in recreation and tourism facilities in protected areas and how it can be better managed. The following questions aim to explore why site hardening decisions are made and what processes and strategies are employed in the decision making process. It also aims to explore what the alternatives to development are.

1. What impacts (environmental/social) were present prior to development at Monkey Mia/Tree Top Walk?
 - a) How/were these impacts monitored e.g. visitor satisfaction/surveys, monitoring programmes and when were they monitored?
2. What were the processes and strategies that led to the present level of development at Monkey Mia/Tree Top Walk?
 - a) Do you feel that development was driven as a result of increasing visitor numbers, political pressure, economic decisions, visitor expectations or environmental concerns.
 - b) What guidelines/boundaries were established at the development stage (site proposal): for both the visitor centre and the upgrade of facilities at the Monkey Mia Caravan Park/at Tree Top Walk?
 - c) Were these adhered to?
3. Was the local community involved in the development process for both the visitor centre and the upgrade of facilities at the Monkey Mia Caravan Park/at Tree Top Walk?
4. Were other management alternatives considered prior to the present level of construction/development at Monkey Mia/Tree Top Walk? e.g. use restrictions?
 - a) If so, what were they? (i.e. was it a sliding scale of events and it just got bigger)
5. What other areas/facilities have been upgraded as a result of increasing visitor numbers in Shark Bay/Walpole?
 - a) What level of development has occurred at these sites e.g. car parks, roads, barbecues/shelters/other structures.
 - b) Who is responsible for the decision making process and continued maintenance of this development?
 - c) What was the reasoning behind the decision to include more facilities/development?
6. How are increasing visitor levels at Monkey Mia/Tree Top Walk currently being managed?
7. Do you feel that the visitor profile and expectations has changed post-development at Monkey Mia/Tree Top Walk? If so, how has this affected management decisions? e.g. increase in policing behaviour, change in type of interpretation offered.
8. What management actions have been put in place to deal with environmental/social impacts as a result of increasing visitor pressure post-development at Monkey Mia/Tree Top Walk?
9. What do you see as the future of Monkey Mia/Tree Top Walk with increasing visitor numbers? e.g. site expansion, increase in facilities, increase in ranger presence.
10. In managing Monkey Mia/Tree Top Walk, what is the principle concern - increasing visitor numbers, visitor satisfaction or environmental impacts?
11. Do you believe that the development of Monkey Mia/Tree Top Walk has been a success in ameliorating impacts?

APPENDIX C: MONKEY MIA VISITOR SURVEY



MONKEY MIA VISITOR SURVEY

Your feedback is important to us.

Hello

The School of Environmental Science at Murdoch University in cooperation with the Department of Conservation and Land Management (CALM) are conducting a study on visitor use in Monkey Mia.

We would like to thank you for your time and assistance in filling in this survey. Your feedback is greatly appreciated and will be helpful in managing our natural areas, both in protecting natural values and providing desirable recreational opportunities for users.

Thank you.

Amanda J. Smith
 Postdoctoral Fellow
 School of Environmental Science
 Murdoch University
 South Street, Murdoch WA 6150
 Phone: (08) 9360 6577

If you have any concerns regarding this survey, please contact Research Ethics Office at Murdoch University, Phone: (08) 9360 6677.

PART I

YOUR VISIT

1. Was this your first visit to Monkey Mia Reserve? (please mark [✓] one box)

(i) Yes..... (please go to Question 2)

(ii) No (please answer below)

If you answered No, please answer the following section, then go to Question 3.

a) What was the year of your first visit to Monkey Mia?

b) Approximately how many times have you visited Monkey Mia?

Number of visits: _____

c) How many times per year, on average, do you typically visit Monkey Mia?

Number of times per year: _____

Once complete, please go to Question 3

2. If this was your first visit to Monkey Mia, would you return? (please mark [✓] one box)

Yes

No

What are the main reasons you would or would not return?

3. Thinking of your trip, was this visit to Monkey Mia..... (please mark [✓] one box)

The main purpose of your trip	<input type="checkbox"/>
One of several destinations on this trip	<input type="checkbox"/>
Not a planned destination on this trip	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

4. How long did you stay in Monkey Mia/Shark Bay during this visit? (please mark [✓] one box)

Less than half a day	<input type="checkbox"/>
Half a day to a day	<input type="checkbox"/>
1 night	<input type="checkbox"/>
2-3 nights	<input type="checkbox"/>
4-5 nights	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

5. What type of group were you with while visiting Monkey Mia? (please mark [✓] one box)

By yourself	<input type="checkbox"/>
With friends	<input type="checkbox"/>
With spouse or partner	<input type="checkbox"/>
With family	<input type="checkbox"/>
With family & friends	<input type="checkbox"/>
With a club or organised group	<input type="checkbox"/>
As part of a commercial tour	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

6. Including yourself, how many people were in your personal (i.e. immediate family/friends) travel group?

Number of people: _____

7. What was your main means of transport to Monkey Mia/Shark Bay? (please mark [x] one box)

Aeroplane	<input type="checkbox"/>
Passenger vehicle (Two wheel drive)	<input type="checkbox"/>
Motorcycle	<input type="checkbox"/>
Four wheel drive vehicle	<input type="checkbox"/>
Compass/motor home	<input type="checkbox"/>
Four bar coach	<input type="checkbox"/>
Bus transport from Dordain	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

8. What type of accommodation did you stay while visiting Monkey Mia/Shark Bay? (please mark [x] one box)

Camping park (caravan/tent)	<input type="checkbox"/>
Monkey Mia Resort	<input type="checkbox"/>
Hotel/motel/visitor centre/Dordain	<input type="checkbox"/>
Self-catering accommodation in Dordain (e.g. house, apartment, unit)	<input type="checkbox"/>
Residence, friend, relative	<input type="checkbox"/>
Local residence	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

9. During this visit, which sites/facilities did you visit/use at Monkey Mia? (please mark [x] all that apply)

Monkey Mia Visitor Centre	<input type="checkbox"/>
Monkey Mia Resort	<input type="checkbox"/>
Captain's house	<input type="checkbox"/>
Jetty	<input type="checkbox"/>
Four beach camp	<input type="checkbox"/>
Shop	<input type="checkbox"/>
Toilets	<input type="checkbox"/>
Barbecue	<input type="checkbox"/>
Monkey Mia walk trail	<input type="checkbox"/>
Letters at Resort	<input type="checkbox"/>
Beach shelter	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

10. What activities have you participated in during this visit to Monkey Mia? (please mark [x] all that apply)

Fishing	<input type="checkbox"/>
Viewing dolphins/dolphin interaction	<input type="checkbox"/>
Viewing ocean wildlife	<input type="checkbox"/>
Viewing terrestrial wildlife	<input type="checkbox"/>
Organised cruise of Shark Bay Marine Park	<input type="checkbox"/>
Swimming	<input type="checkbox"/>
Snorkelling/diving	<input type="checkbox"/>
Boating	<input type="checkbox"/>
Walking/hiking	<input type="checkbox"/>
Camping/Caravanning	<input type="checkbox"/>
Photography	<input type="checkbox"/>
Fresh produce	<input type="checkbox"/>
Commercial tour (please specify what type) _____	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>

PART II

YOUR REASONS FOR VISITING

11. From the list below try to recall how important each reason for visiting Monkey Mia was to you during this visit. (please mark [x] the appropriate box)

Item	Not important	Minor importance	Important	Very important	Extremely important
To view the dolphins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To visit the Monkey Mia Visitor Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To visit Monkey Mia Resort and it's facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To go on a cruise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To spend time with companion(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relaxing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To escape everyday routine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holiday, tourism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To view wildlife	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To be in & enjoy a natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To enjoy outdoor activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To learn about nature (environmental education)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To visit a World Heritage Area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swimming/Snorkelling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

We would like to know your preference for certain "experiences" when visiting natural areas. For each of the following, please circle the number that best matches your personal preference.

12. My preferred natural area experience is....

1	2	3	4	5
In a totally natural landscape with no facilities (e.g. walk trails not well defined, no signage)		In a very natural landscape with limited facilities (e.g. walk trails are evident, some signage)		In a somewhat natural landscape with well developed facilities (e.g. visitor centre, developed walk trails)

13. I prefer to visit natural areas where access is....

1	2	3	4	5
very limited with no direct access routes (e.g. rough walk trails, no trails)		somewhat limited and access routes are semi-developed (e.g. unsealed roads, developed walk trails)		totally unlimited with well developed access (e.g. sealed roads, well developed walk trails)

14. I prefer to visit natural areas where meeting others is....

1	2	3	4	5
highly unlikely at natural during visit (e.g. few people within sight or sound)		fairly likely during visit (e.g. others are present on walk trails, at the beach)		highly likely during (e.g. high levels of interaction with other visitors on site)

PART III

EXISTING CONDITIONS

15. Thinking about your experience at Monkey Mia, how would/did each of the following add or detract to the quality of your visit? (please mark [✓] the appropriate box).

Items	Greatly detract	Detract	No influence	Add	Greatly add
The presence of the Monkey Mia Visitor Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of Monkey Mia Resort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of the Café/restaurant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of the jetty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of the boat launch ramp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of the shop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of barbecues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of the Monkey Mia walk trail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of lawns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of beach shelters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The presence of Conservation & Land Management Ranges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Did you notice any environmental impacts while visiting Monkey Mia that you believe were caused by inappropriate behaviour by others? (please mark [✓] one box).

- Yes
No

If you answered yes to the above question,

what was the impact you noticed

where did you notice the impact.

17. Thinking of your expectations before arriving at Monkey Mia, please consider whether each of the following attributes was better, about the same or worse than you expected? (please mark [✓] the appropriate box).

Items	Much worse than I expected	Worse than I expected	About the same as I expected	Better than I expected	Much better than I expected	No opinion
Location of the Monkey Mia Visitor Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location of the Monkey Mia Resort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of other people at dolphin viewing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of other people at the Monkey Mia Visitor Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Behaviour of other visitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sightings of dolphins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sightings of other wildlife	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condition of natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Absence of litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART IV

FUTURE CONDITIONS

18. If in the future, visitor use at Monkey Mia increased to a point where the resources or quality of experiences were threatened, a number of management actions could be considered? Please indicate how you feel about each of the following suggested potential management actions (please mark [✓] the appropriate box).

Items	Strongly oppose	Oppose	Support	Strongly support	Neither support nor oppose
Expand the Monkey Mia Resort to accommodate increasing visitor use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Limit use (e.g. limit numbers of people entering Monkey Mia)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discourage use of overused areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increase presence of Conservation & Land Management Ranges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide more facilities e.g. barbecues, beach shelters, toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prevent provisioning (feeding) of dolphins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide areas with limited vehicular access to give a "remote" visitor experience and provide environmental refuge areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART V

INFORMATION ABOUT YOURSELF

19. Where do you usually live? (please mark [✓] one box)

- Local
Foothills Region
Other WA
 interstate (please specify) _____
 Overseas (please specify) _____

20. What is your age? (please mark [✓] one box)

- 16-24
25-39
40-59
60 and over

21. Are you: (please mark [✓] one box)

- Male
Female

Thank you for your time, your participation is greatly appreciated. Please return the questionnaire to the surveyor or the Monkey Mia Visitor Centre.

APPENDIX D: FLORA OF MONKEY MIA

The four landform units of Monkey Mia Reserve include red sandplain, white coastal dunes, coastal sandplain and salt pans or birridas. Following are the associated species with these landform units (CALM 1993):

Red Sandplain

Large shrubs

Acacia ramulose
A. sclerosperma
A. tetragonophylla
Exocarpus sparteus
Eucalyptus oleosa
Grevillea eriostachya
Heterodendrum oleaefolium

Climbers

Boerhavia chinensis
Marsdenia australis
Stipa elegantissima

Coastal Sandplain

Acacia sclerosperma
Scholtzia spp.
Rhagodia preissii
Halosarcia spp.
Frankenia pauciflora
Sporobolus virginicus

Salt pan or Birrida

Halosarcia spp.
Frankenia pauciflora

Small shrubs

Dodonaea inaequifolia
Eremophila platycalyx
Eremophila oldfieldii
Labichea cassioides
Melaleuca aff. nesophila
Scholtzia umbellifera
Triumfetta appendiculata

Ephemerals

Podolepis canescens

Coastal Dunes

A. sclerosperma
Spinifex longifolius
Halosarcia spp.
Sporobolus spp.

There are no declared rare flora on the Reserve, nor species on CALM's priority flora list.

REFERENCES

- B.C. Forest Service (1995). *The 1993 Northeastern British Columbia recreation survey*, Ministry of B.C. Forests, Recreation Section, Range, Recreation and Forest Practices Branch, British Columbia, Canada.
- Bates, G.M. (1995). *Environmental law in Australia*, Butterworths, Sydney, NSW.
- Bejder, L. & Samuels, A. (2003). 'Evaluating the effects of nature-based tourism on cetaceans' in: N. Gales, M. Hindell & R. Kirkwood (Eds). *Marine mammals: fisheries, tourism and management issues*, CSIRO Publishing, Collingwood, VIC.
- Benfield, R.W. (2001). 'Good things come to those who wait: sustainable tourism and timed entry at Sissinghurst Castle Garden, Kent', *Tourism Geographies*, vol. 3, pp. 207-217.
- Blakesley, J.A. & Reese, K.P. (1988). 'Avian use of campground and noncampground sites in riparian zones', *Journal of Wildlife Management*, vol. 52, pp. 399-402.
- Blamey, R.K. & Hatch, D. (1998). *Profiles and motivations of nature based tourists visiting Australia*, Occasional Paper No. 25, Bureau of Tourism Research, Canberra, ACT.
- Bowdler, S. (1995). 'The excavation of two small rockshelters at Monkey Mia, Shark Bay, Western Australia', *Australian Archaeology*, vol. 40, pp. 1-13.
- Bowman Bishaw Gorham (2004). *Expansion of Monkey Mia dolphin resort environmental scoping document - public environmental review*, Assessment Number 1455, Bowman Bishaw Gorham, Subiaco, WA.
- Buhalis, D. (1999). 'Limits of tourism development in peripheral destinations: problems and challenges', *Tourism Management*, vol. 20, pp. 183-185.
- Bulbeck, C. (2005). *Facing the wild: ecotourism, conservation and animal encounters*, Earthscan, London.
- Burger, J. & Gochfield, M. (1998). 'Effects of ecotourists on bird behaviour at Loxahatchee National Wildlife Refuge, Florida', *Environmental Conservation*, vol. 25, pp. 13-21.
- CALM (1990). *Walpole-Nornalup National Park draft management plan 1990*, Dept. of Conservation and Land Management, Perth, WA.
- CALM (1992). *Walpole-Nornalup National park management plan 1992-2002*, Dept. of Conservation and Land Management, Perth, WA.
- CALM (1993). *Monkey Mia Reserve: draft management plan*, Dept of Conservation and Land Management, Perth, WA.
- CALM (1994). 'Tree Top Walk & Valley of the Giants redevelopment', Report for Corporate Executive, Valley of the Giants Project Team, Dept. of Conservation and Land Management, Perth, WA.
- CALM (1996). *Shark Bay marine reserves management plan 1996-2006*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2000a). *Shark Bay terrestrial reserves management plan 2000-2009*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2000b). *Walpole Nornalup national park visitor feedback program, Feb to Apr 2000*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2001). *Walpole Nornalup national park visitor feedback program, Dec 2000 to Apr 2001*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2002a). *Monkey Mia visitor feedback program, May 2002*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2002b). *Monkey Mia visitor feedback program, October 2002*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2003a). *Monkey Mia visitor feedback program, June 2003*, Dept of Conservation and Land Management, Perth, WA.
- CALM (2003b). 'Nature base: Monkey Mia reserve' (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 20/11/2003, http://www.calm.wa.gov.au/national_parks/previous_parks_month/monkeymia_reserve.html
- CALM (2003c). 'Nature base: Monkey Mia visitor centre' (Homepage of Dept of Conservation and Land Management, Perth, WA, Australia), viewed 14/10/03, http://www.calm.wa.gov.au/tourism/monkeymia_vc_splash.html
- CALM (2003d). 'Nature base: Valley of the Giants' (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 14/10/2003, http://www.calm.wa.gov.au/tourism/valley_of_the_giants.html

- CALM (2004a). 'Nature base: news data - state government rolls out capital works for national parks', (Homepage of Dept of Conservation and Land Management, Como, Western Australia), viewed 09/08/2004, <http://www.naturebase.net/news/NewsData/html/1015832016.html>
- CALM (2004b). 'Nature base: second WA tourism award to Valley of the Giants Tree Top Walk', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/2004, <http://www.calm.wa.gov.au/news/NewsData/930534045.html>
- CALM (2004c). 'Nature base: top awards for CALM', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/2004, http://www.calm.wa.gov.au/news/NewsData/html/mr_00123.html
- CALM (2004d). 'Nature base: Tree Top Walk - big south-west attraction', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/04, http://www.calm.wa.gov.au/news/NewsData/html/mr_00101.html
- CALM (2004e). 'Nature base: Tree Top Walk and Valley of the Giants open', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/2004, <http://www.calm.wa.gov.au/news/news.cgi?item=923494158>
- CALM (2004f). 'Nature base: Tree Top Walk wins British Airways tourism award', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/2004, <http://www.calm.wa.gov.au/news/news.cgi?item=1068604608>
- CALM (2004g). 'Nature base: Valley of the Giants Tree Top Walk, an overview for senior students', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/2004, <http://www.calm.wa.gov.au/>
- CALM (2004h). 'Nature base: Walpole Tree Top Walk wins national award', (Homepage of Dept of Conservation and Land Management, Western Australia), viewed 03/03/2004, <http://www.calm.wa.gov.au/news/NewsData/975632366.html>
- CALM (unpub.-a). 'CALM visitor statistics (VISTAT) for Monkey Mia 1987 to 2002', Dept of Conservation and Land Management, Monkey Mia, WA.
- CALM (unpub.-b). 'CALM visitor statistics (VISTAT) for Tree Top Walk 1996 to 2003', Dept of Conservation and Land Management, Walpole, WA.
- CALM (unpub. 2003a). 'Tree Top Walk comment card summary 2003', Unpublished Report, Dept of Conservation and Land Management, Nornalup, WA.
- CALM (unpub. 2003b). 'Tree Top Walk source visitation analysis 2002/03', Unpublished Report, Dept of Conservation and Land Management, Nornalup, WA.
- CALM (unpub. 2004). 'Tree Top Walk comment card summary 2004', Unpublished Report, Dept of Conservation and Land Management, Nornalup, WA.
- Ceballos-Lascurain, H. (1996). *Tourism, ecotourism and protected areas*, IUCN - The World Conservation Union, Cambridge, UK.
- Cessford, G.R. (2000). 'Identifying research needs for improved management of social impacts in wilderness recreation' in: D.N. Cole, S.F. McCool, W.A. Freimund, W.T. Borrie & J. O'Loughlin (Eds). 'Wilderness science in a time of change conference, Missoula, MT', 23-27 May, Proceedings Vol. 4: Wilderness visitors, experiences, and visitor management, USDA Forest Service, Rocky Mountain Research Station, Ogden, UT, pp. 231-238.
- Chin, C.L.M., Moore, S.A., Wallington, T.J. & Dowling, R.K. (2000). 'Ecotourism in Bako national park, Borneo: visitors' perspectives on environmental impacts and their management', *Journal of Sustainable Tourism*, vol. 8, pp. 20-35.
- Clark, R.N. & Stankey, G.H. (1979). *The recreation opportunity spectrum: a framework for planning, management and research*, USDA Forest Service, Ogden, UT.
- Coffs Coast Visitor Information Centre (2004). 'National parks', (Homepage of Coffs Coast Visitor Information Centre, Coffs Harbour, NSW), viewed 09/08/2004, http://www.coffscoast.com.au/national_parks.htm
- Cole, D.N. (1983). 'Monitoring the condition of wilderness campsites', Research Paper INT-302, USDA, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- Cole, D.N. (1990). 'Campsite management and monitoring in wilderness: some principles to guide wilderness campsite management' in: D.W. Lime (Ed). 'Management America's enduring wilderness resource: proceedings of the conference, Minneapolis, MN', 11-17 Sept 1989, USDA Forest Service, Ogden, UT, pp. 181-187.
- Cole, D.N. (1995). 'Disturbance of natural vegetation by camping: experimental applications of low-level stress', *Environmental Management*, vol. 19, pp. 405-416.

- Cole, D.N. & Landres, P.B. (1995). 'Indirect effects of recreation on wildlife' in: R.L. Knight & K.J. Gutzwiller (Eds). *Wildlife and recreationists: coexistence through management and research*, Island Press, Washington, DC, pp. 183-202.
- Cole, D.N. & McCool, S.F. (2000). 'Wilderness visitors, experiences, and visitor management' in: D.N. Cole, S.F. McCool, W.A. Freimund, W.T. Borrie & J. O'Loughlin (Eds). 'Wilderness science in a time of change conference, Missoula, MT', 23-27 May 1999, Proceedings Vol. 4: Wilderness visitors, experiences, and visitor management, USDA Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Cole, D. N. & Monz, C.A. (2004). 'Spatial patterns of recreation impact on experimental campsites', *Journal of Environmental Management*, vol. 70, pp. 73-84.
- Cole, D.N., Petersen, M.E. & Lucas, R.C. (1987). 'Managing wilderness recreation use: common problems and potential solutions', General Technical Report INT-230, USDA Forest Service, Intermountain Research Station, Ogden, UT.
- Deng, J., King, B. & Bauer, T. (2002). 'Evaluating natural attractions for tourism', *Annals of Tourism Research*, vol. 29, pp. 422-438.
- Dept of Industry Tourism and Resources (1998). 'Tourism facts no. 15', (Homepage of Department of Industry, Science and Tourism, Australia), viewed 29/07/2002, <http://www.industry.gov.au>
- Dept of Industry Tourism and Resources (2002). '10-year strategic plan for tourism', (Homepage of Department of Industry, Science and Tourism, Australia), viewed 27/07/2002, <http://www.industry.gov.au>
- DOLA (2002). 'Major upgrade for Monkey Mia resort', *Landmarks*, vol. 35, p. 5.
- Duffus, D.A. & Dearden, P. (1990). 'Non-consumptive wildlife oriented recreation: a conceptual framework', *Biological Conservation*, vol. 53, pp. 213-231.
- Dustin, D. & McAvoy, L. (1980). 'Hardening national parks', *Environmental Ethics*, vol. 2, pp. 29-44.
- Edwards, H. (1987). 'The remarkable dolphins of Monkey Mia', *Australian Geographic*, vol 7, pp. 46-63.
- Environmental Protection Authority (EPA) (1989). 'Disappearance of dolphins at Monkey Mia: findings of a preliminary investigation', Bulletin No. 381, March 1989, Environmental Protection Authority, Perth, WA.
- Fairfax Walk About (2003). 'Walk about: Australian travel guide, Monkey Mia', (Homepage of Fairfax Walk About), viewed 02/08/2004, <http://www.walkabout.com.au/locations/WAMonkeyMia.shtml>
- Fowler, G.S. (1999). 'Behavioural and hormonal responses of Magellanic penguins (*Spheniscus magellanicus*) to tourism and nest site visitation', *Biological Conservation*, vol. 90, pp. 143-149.
- Frankfort-Nachmias, C. & Nachmias, D. (1992). *Research methods in the social sciences*, St Martins Press, New York.
- Gabrielsen, G.W. & Smith, E.N. (1995). 'Physiological responses of wildlife to disturbance' in: R.L. Knight & K.J. Gutzwiller (Eds). *Wildlife and recreationists: coexistence through management and research*, Island Press, Washington, DC.
- Gill, J.A., Sutherland, W.J. & Watkinson, A.R. (1996). 'A method to quantify the effects of human disturbance on animal populations', *Journal of Applied Ecology*, vol. 33, pp. 786-792.
- Goodwin, H., Kent, I., Parker, K. & Walpole, M. (1998). *Tourism, conservation and sustainable development: case studies from Asia and Africa*, International Institute for Environment & Development, London.
- Government Gazette (2003). Wildlife conservation (specially protected fauna) Notice 2003, 11 April 2003, pp. 1158-1167, Government Gazette, Perth, WA.
- Green, R. & Higginbottom, K. (2001). *Negative effects of wildlife tourism on wildlife*, Wildlife Tourism Research Report Series: No. 5. Status Assessment of Wildlife Tourism in Australia Series, Sustainable Tourism CRC, Gold Coast, QLD.
- Grossberg, R., Treves, A. & Naughton-Treves, L. (2003). 'The incidental ecotourist: measuring visitor impacts on endangered howler monkeys at a Belizean archaeological site', *Environmental Conservation*, vol. 30, pp. 40-51.
- Guild, F. (1996). 'Traders fear boom will pass them by', *Sunday Times, Western Australia*, Perth, WA.
- Hall, T.E. & Shelby, B. (1998). 'Changes in use of three Oregon, USA, wildernesses', *Environmental Management*, vol. 22, pp. 89-98.
- Hammit, W.E. & Cole, D.N. (1998). *Wildland recreation: ecology and management*, John Wiley & Sons, Inc., New York.
- Hendee, J.C. & Lucas, R.C. (1973). 'Mandatory wilderness permits: a necessary management tool', *Journal of Forestry*, vol. 72, pp. 100-101.
- Higham, J.E.S. (1998). 'Tourists and albatrosses: the dynamics of tourism at the Northern Royal Albatross Colony, Taiaroa Head, New Zealand', *Tourism Management*, vol. 19, pp. 521-531.

- Hughes, M. (2003). 'Influence of varying intensities on natural area on-site interpretation on attitudes and knowledge', Doctor of Philosophy Thesis, College of Science and Technology, University of Notre Dame & School of Environmental Science, Murdoch University, WA.
- Hughes, M. & Morrison-Saunders, A. (2002). 'Impact of trail-side interpretive signs on visitor knowledge', *Journal of Ecotourism*, vol. 1, pp. 122-132.
- Hughes, M. & Morrison-Saunders, A. (2003). 'Visitor attitudes toward a modified natural attraction', *Society & Natural Resources*, vol. 16, pp. 191 - 203.
- Kearsley, G. & Coughlan, D. (1999). 'Coping with crowding: tourist displacement in the New Zealand backcountry', *Current Issues in Tourism*, vol. 2, pp. 197-210.
- Knight, R.L. & Gutzwiller, K.J. (1995). *Wildlife and recreationists: coexistence through management and research*, Island Press, Washington, DC.
- Kuss, F.R., Graefe, A.R. & Vaske, J.J. (1990). *Visitor impact management: a review of research*, National Parks and Conservation Association, Washington DC.
- Leung, Y.F. & Marion, J.L. (2000a). 'Recreation impacts and management in wilderness: a state-of-knowledge review' in: D.N. Cole, S.F. McCool, W.A. Freimund, W.T. Borrie & J. O'Loughlin (Eds). 'Wilderness science in a time of change conference', Missoula, MT, 23-27 May 1999, Proceedings Vol. 5: Wilderness ecosystems, threats, and management, USDA Forest Service, Rocky Mountain Research Station, Ogden, UT, pp. 23-48.
- Leung, Y.F. & Marion, J.L. (2000b). 'Wilderness campsite conditions under an unregulated camping policy: an eastern example' in: D.N. Cole, S.F. McCool, W.A. Freimund, W.T. Borrie & J. O'Loughlin (Eds). 'Wilderness science in a time of change conference', Missoula, MT, 23-27 May 1999, Proceedings Vol. 5: Wilderness ecosystems, threats, and management, USDA Forest Service, Rocky Mountain Research Station, Ogden, UT, pp. 148-152.
- Lewis, A. & Newsome, D. (2003). 'Planning for stingray tourism at Hamelin Bay, Western Australia: the importance of stakeholder perspectives', *International Journal of Tourism Research*, vol. 5, pp. 331-346.
- Lucas, R.C. (1990a). 'The wilderness experience and managing the factors that influence it' in: J.C. Hendee, G.H. Stankey & R.C. Lucas (Eds). *Wilderness management*, North American Press, Colorado, pp. 469-495.
- Lucas, R.C. (1990b). 'Wilderness recreation management: a general overview' in: J.C. Hendee, G.H. Stankey & R.C. Lucas (Eds.). *Wilderness management*, North American Press, Colorado, pp. 401-422.
- Lucas, R.C. (1990c). 'Wilderness use and users: trends and projections' in: J.C. Hendee, G.H. Stankey & R.C. Lucas (Eds.). *Wilderness management*, North American Press, Colorado, pp. 354-398.
- Mann, J., Connor, R.C., Barre, L.M. & Heithaus, M.R. (2000). 'Female reproductive success in bottlenose dolphins (*Tursiops sp.*): life history, habitat, provisioning, and group-size effects', *Behavioral Ecology*, vol. 11, pp. 210-219.
- Mann, J. & Kemp, C. (2003). 'The effects of provisioning on maternal care in wild bottlenose dolphins, Shark Bay, Australia' in: N. Gales, M. Hindell & R. Kirkwood (Eds). *Marine mammals: fisheries, tourism and management issues*, CSIRO Publishing, Collingwood, VIC, pp. 305-317.
- Manning, R. E. (2004). 'Managing impacts through use rationing and allocation' in: R. Buckley (Ed). *Environmental impacts of ecotourism*, CABI Publishing, Wallingford, UK, pp. 273-286.
- Manning, R.E. & Lime, D.W. (2000). 'Defining and managing the quality of wilderness recreation experiences' in: D.N. Cole, S.F. McCool, W.A. Freimund, W.T. Borrie & J. O'Loughlin (Eds). 'Wilderness science in a time of change conference', Missoula, MT, 23-27 May 1999, Proceedings Vol. 4: Wilderness visitors, experiences, and visitor management, USDA Forest Service, Rocky Mountain Research Station, Ogden, UT, pp. 13-52.
- Manning, R.E., Lime, D.W. & Hof, M. (1996). 'Social carrying capacity of natural areas: theory and application in the U.S. national parks', *Natural Areas Journal*, vol. 16, pp. 118-127.
- Marion, J.L. (1995). 'Capabilities and management utility of recreation impact monitoring programs', *Environmental Management*, vol. 19, pp. 763-771.
- Marion, J.L. & Farrell, T.A. (2002). 'Management practices that concentrate visitor activities: camping impact management at Isle Royale National Park, USA', *Journal of Environmental Management*, vol. 66, pp. 201-212.
- Marsh, H. (1994). 'The distribution and abundance of the dugong in Shark Bay, Western Australia', *Wildlife Research*, vol. 21, pp. 149-161.
- Martin, S.R., McCool, S.F. & Lucas, R.C. (1989). 'Wilderness campsite impacts: do managers and visitors see them the same', *Environmental Management*, vol. 13, pp. 623-629.
- Mason, P. (2005) Visitor management in protected areas: from 'hard' to 'soft' approaches, *Current Issues in Tourism*, vol. 8, pp. 181-194.

- Mayes, G. & Richins, H. (2004). 'What effect does swimming with wild dolphins have upon the pro-environmental attitudes, beliefs, intended behaviours and intended actions of participants? 10-13th February 2004' in: C. Cooper, C. Arcodia, D. Solnet & M. Whitford (Eds). *CAUTHE 2004: creating tourism knowledge*, The University of Queensland, Brisbane, QLD, pp. 483-497.
- Mbaiwa, J.. (2003). 'The socio-economic and environmental impacts of tourism development on the Okavango Delta, north-western Botswana', *Journal of Arid Environments*, vol. 54, pp. 447-467.
- McCool, S.F. (2001). 'Limiting recreational use in wilderness: research issues and management challenges in appraising their effectiveness' in: W.A. Freimund & D.N. Cole (Eds). 'Visitor use density and wilderness experience', Missoula, MT, USA, 1-3 June 2000, USDA Forest Service Proceedings, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.
- McKenna, S. (2004). 'Shark Bay world heritage property', *Landscape*, vol. 19, pp. 50-56.
- Monkey Mia Dolphin Resort (2004). 'Monkey Mia dolphin resort', (Homepage of Monkey Mia Dolphin Resort), viewed 02/08/2004, <http://www.monkeymia.com.au>
- Monkey Mia Dolphin Resort (n.d.). 'Monkey Mia dolphin resort Shark Bay: pure paradise', Monkey Mia Dolphin Resort, Denham, WA.
- Morin, S.L., Moore, S.A. & Schmidt, W. (1997). 'Defining indicators and standards for recreation impacts in Nuyts Wilderness, Walpole-Nornalup national park, Western Australia', *CALMScience*, vol. 2, pp. 247-266.
- Newsome, D., Moore, S. & Dowling, R. (2002). *Natural area tourism: ecology, impacts and management*, Channel View Publications, Clevedon, UK.
- O'Neill, F., Barnard, S. & Lee, D. (2004). *Best practice and interpretation in tourist/wildlife encounters: a wild dolphin swim tour example*, Sustainable Tourism CRC, Gold Coast, QLD.
- O'Reilly's Rainforest Guesthouse (2004). 'Tree Top Walk', (Homepage of O'Reillys Rainforest Guesthouse, Queensland, Australia), viewed 09/08/2004, <http://www.oreillys.com.au/content/standard.asp?name=TreetopWalk>
- Orams, M.B. (1994). 'Tourism and marine wildlife: the wild dolphins of Tangalooma, Australia', *Anthrozoos*, vol. 7, pp. 195-201.
- Orams, M.B. (1995). 'Development and management of a feeding program for wild bottlenose dolphins at Tangalooma, Australia', *Aquatic Mammals*, vol. 21, pp. 137-147.
- Orams, M.B. (1997). 'Historical accounts of human-dolphin interaction and recent developments in wild dolphin based tourism in Australasia', *Tourism Management*, vol. 18, pp. 317-326.
- Orams, M.B. (2002). 'Feeding wildlife as a tourism attraction: a review of issues and impacts', *Tourism Management*, vol. 23, pp. 281-293.
- Polley, M. (2002). 'Visitor perceptions and preferences regarding Cape Range national park', Honours Thesis, Murdoch University, School of Environmental Science, Murdoch, WA.
- Preen, A.R., Marsh, H., Lawler, I.R., Prince, R.I.T. & Shepherd, R. (1997). 'Distribution and abundance of dugongs, turtles, dolphins and other megafauna in Shark Bay, Ningaloo Reef and Exmouth Gulf, Western Australia', *Wildlife Research*, vol. 24, pp. 185-208.
- Raffaele, P. (1989). 'Shark Bay', *Australian Geographic*, vol. 14, pp. 54-77.
- Raffaele, P. (2003). 'Return to Shark Bay', *Australian Geographic*, vol. 72, pp. 101-115.
- Reark Research (1995). 'A summary report of the findings of the Shark Bay visitor survey', Reark Research, Subiaco, WA.
- Roe, D., Leader Williams, N. & Dalal Clayton, B. (1997). *Take only photographs, leave only footprints: the environmental impacts of wildlife tourism*, Wildlife and Development Series No. 10, International Institute for Environment and Development, London.
- Roggenbuck, J.W. & Lucas, R. C. (1987). 'Wilderness use and user characteristics: a state-of-knowledge review' in: R.C. Lucas (Ed). 'Proceedings - National Wilderness research conference: issues, state-of-knowledge, future directions', Fort Collins, CO, July 23-26, General Technical Report INT-220, USDA Forest Service, Intermountain Research Station, Ogden, UT, pp. 203-244.
- Samuels, A., Charles, D. & Flaherty, C. (2003). 'Introducing piccolo!', *Monkey Mia News*, Autumn, p. 7.
- Sarantankos, S. (1993). *Social research*, Macmillan Education Australia, Melbourne, VIC.
- Shadbolt, R. (1998). 'Ecotourism and visitor management at Monkey Mia', *Proceedings of the Ecotourism Association of Australia 1998 national conference*, Ecotourism Association of Australia, Margaret River, WA.
- Shire of Shark Bay (1998). *Shark Bay regional strategy: a review of the 1988 Shark Bay region plan*, Shire of Shark Bay, Denham, WA.
- Shire of Shark Bay (2003). *Annual report 2002-2003*, Shire of Shark Bay, Denham, WA.
- Smith, A.J. (1998). 'Environmental impacts of recreation and tourism in Warren national park, Western Australia and appropriate management planning', Honours Thesis, Murdoch University, Murdoch, WA.

- Smith, A.J. (2003). 'Campsite impact monitoring in the temperate eucalypt forests of Western Australia: an integrated approach', Doctor of Philosophy Thesis, Murdoch University, Murdoch, WA.
- Smith, A.J. & Newsome, D. (2002). 'An integrated approach to assessing, managing and monitoring campsite impacts in Warren National Park, Western Australia', *Journal of Sustainable Tourism*, vol. 10, pp. 343-359.
- Trumbull, V.L., Dubois, P.C., Brozka, R.J. & Guyette, R. (1994). 'Military camping impacts on vegetation and soils of the Ozark Plateau', *Journal of Environmental Management*, vol. 40, pp. 329-339.
- Turton, S. & Stork, N.E. (2004). 'International tourism and tropical rainforests: opportunity or threat?' in: W.F. Laurance & C.A. Peres (Eds). *Emerging threats to tropical forests*, University of Chicago Press, Chicago, Ill.
- Visit Western Australia Online (2004). 'Monkey Mia Holidays', (Homepage of Visit Western Australia Online), viewed 02/08/2004, http://www.visitwa.com.au/monkey_mia/
- Washburne, R.F. & Cole, D.N. (1983). 'Problems and practices in wilderness management: a survey of managers', Research Paper INT-304, USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- WATC (1988). *Shark Bay visitor survey, final results*, Western Australian Tourism Commission, Perth, WA.
- WATC (2002a). *Research review on domestic visitor activity: Gascoyne*, Western Australian Tourism Commission, Perth, WA.
- WATC (2002b). *Research review on domestic visitor activity: Southwest*, Western Australian Tourism Commission, Perth, WA.
- Weaver, D. (2001). *Ecotourism*, John Wiley & Sons Australia, Milton, QLD.
- Welford, R., Ytterhus, B. & Eligh, J. (1999). 'Tourism and sustainable development: an analysis of policy and guidelines for managing provision and consumption', *Sustainable Development*, vol. 7, pp. 165-177.
- Wilson, B.F. (1994). *Review of dolphin management at Monkey Mia*, Murex Consultants, Perth, WA.
- Winfield, C. (1996). 'Saving the giants', *Landscape*, vol. 12, pp. 10-16.
- Winfield, C. (2001). 'Saving the giants' in: G. Worboys, Lockwood, M., de Lacy, T., McNamara, C., Boyd, M., and O'Connor, M. (Ed). *Protected area management: principles and practice*, Oxford University Press, Melbourne, VIC, pp. 271 & 295.
- Yu, D.W., Hendrickson, T. & Castillo, A. (1997). 'Ecotourism and conservation in Amazonian Peru: short-term and long-term challenges', *Biological Conservation*, vol. 24, pp. 130-138.

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