DESERT KNOWLEDGE CRC

On Track: Four wheel drive tourism in desert Australia

Final report Stage 1: January 2006–June 2007

Dean Carson
Andrew Taylor

Report 44

2010

CHARLES DARWIN UNIVERSITY
CHANGE YOUR WORLD.

CRC AUSTRALIA

DESERT KNOWLEDGE CRC

On Track: Four wheel drive tourism in desert Australia

Final report Stage 1:

January 2006–June 2007

Dean Carson

Andrew Taylor

CHARLES DARWIN UNIVERSITY
CHANGE YOUR WORLD.

CRC AUSTRALIA

DESERT KNOWLEDGE CRC

Contributing author information

Dean Carson: Charles Darwin University, Darwin

Andrew Taylor: Charles Darwin University, Darwin

Contributing authors: Paul Box (CSIRO), Greg Cartan (Charles Darwin University), Vanessa Chewings (CSIRO), Alexandra Coghlan (James Cook University), Margaret Friedel (CSIRO), Damien Jacobsen (Charles Darwin University), Roy Jones (Curtin University of Technology), Scott Kimpton (Curtin University of Technology), Jim Macbeth (Murdoch University), Colin Macgregor (Curtin University of Technology), Yamini Narayanan (Murdoch University), Alan Pilgrim (Curtin University of Technology), Zac Powell (Four Wheel Drive Victoria), Bruce Prideaux (James Cook University), Doris Schmallegger (Charles Darwin University)

Desert Knowledge CRC Report Number 44

ISBN: 978 1 74158 166 4 (Online copy)

ISSN: 1832 6684

Citation

Carson D and Taylor A. 2010. *On Track: Four wheel drive tourism in desert Australia*. DKCRC Report 44. Desert Knowledge Cooperative Research Centre, Alice Springs.

The Desert Knowledge Cooperative Research Centre is an unincorporated joint venture with 28 partners whose mission is to develop and disseminate an understanding of sustainable living in remote desert environments, deliver enduring regional economies and livelihoods based on Desert Knowledge, and create the networks to market this knowledge in other desert lands.

For additional information please contact

Desert Knowledge CRC

Publications Officer

PO Box 3971

Alice Springs NT 0871

Australia

Telephone +61 8 8959 6000 Fax +61 8 8959 6048

www.desertknowledgecrc.com.au

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Desert Knowledge CRC. The views expressed herein do not necessarily represent the views of Desert Knowledge CRC or its Participants.

Contents

Tables

Figures and graphs

Abbreviations/Acronyms

AADT	Annual Average Daily Traffic
AAMI	Australian Associated Motor Insurers
ABC	Australian Broadcasting Commission
ABS	Australian Bureau of Statistics
ANFWDC	Australian National Four Wheel Drive Council
ARIA	Accessibility/Remoteness Index of Australia
ATDW	Australian Tourism Data Warehouse
ATSB	Australian Transport Safety Bureau
AVSTATS	Aviation Statistics
AWD	All Wheel Drive
BTRE	Department of Transport and Regional Economics
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
NVS	National Visitor Survey
ORV	Off-Road vehicle
PCA	Pedestrian Council of Australia
QANTAS	Queensland and Northern Territory Aerial Services Ltd
RACV	Royal Automobile Club of Victoria
SLA	Statistical Local Area
SPSS	Statistical Package for the Social Sciences
SOI	Systems of Innovation
SUV	Sports Utility Vehicles
TRA	Tourism Research Australia
UCL	Urban Centre and Locality
URL	Uniform Resource Locator (i.e. web address)
VIC	Visitor Information Centres
VRUM™	Visualising Relatively Unpredictable Movements
WA	Western Australia
4WD	Four Wheel Drive
CTP	Compulsory Third Party
DKCRC	Desert Knowledge Cooperative Research Centre
FWDV	Four Wheel Drive Victoria
GA	Geoscience Australia
GIS	Geographic Information System
GPS	Global Positioning System
IMR	Internet Mediated Research
IP	Intellectual Property
IVS	International Visitor Survey
NSW	New South Wales
NT	Northern Territory
NTTM	Northern Territory Travel Monitor

Acknowledgements

Dear Reader

I would like to express my gratitude to Tourism NT for the financial and in-kind support it has provided to this project through its existing research relationship with Charles Darwin University. The project was guided by a steering committee whose members' enthusiasm, time and contributions were integral to the project's success. The four wheel drive sector was represented on the committee by Hema Maps, Four Wheel Drive Victoria and two tour operators – Direct 4WD from Alice Springs and Global Gypsies from Perth. Aboriginal communities were represented by the Central Land Council. The Northern Territory Parks and Wildlife Service provided their perspectives on the management and impact of this type of tourism.

Finally, I must acknowledge Tourism Australia and the Department of Main Roads, Western Australia who continue to work with us on the development of our geographic information system to represent traveller movements – VRUM™.

Dean Carson

Project Manager

Above: Members of the On Track steering committee and research team in central Australia

Front cover: Image courtesy of Direct 4WD

Four Wheel Drive Victoria and the On Track project

Four Wheel Drive Victoria is an umbrella body for affiliated four wheel drive clubs in Victoria and represents the interests of all recreational four wheel drivers in the state. Adopting the mantra 'driving in a sustainable environment' Four Wheel Drive Victoria has established itself in the modern four wheel drive environment: having regard for the protection of the land in which we tour, supporting the communities through which we travel and contributing to the state's economic wealth.

Four Wheel Drive Victoria acknowledges that many of its members enjoy the freedom of travelling interstate and, in particular, journeying into desert regions. In light of this Four Wheel Drive Victoria felt it was appropriate to assist the research efforts of On Track, a project of the Desert Knowledge Cooperative Research Centre. The purpose of On Track is to improve the capacity of desert settlements to provide viable four wheel drive tourism products whilst protecting cultural, social and natural values (DKCRC 2006).

Four Wheel Drive Victoria is interested in assessing the current four wheel drive market within Victoria and, more widely, Australia and comparing the differences in attitude, motivation and understanding between club and non-club members. Gauging the extent of four wheel drive tourism movements within and outside of Victoria is necessary in order to understand the needs of Four Wheel Drive Victoria's member groups.

Four Wheel Drive Victoria, in association with other On Track partners, facilitated a number of focus groups and subsequent surveys both locally and nationally in an effort to understand the ever growing market for four wheel drive tourism within this country. In addition to gathering information from club members that will provide a direction for further projects, Four Wheel Drive Victoria was keen to gain an understanding about four wheel drivers who are not club members.

Four Wheel Drive Victoria is interested in the differences between club and non-club members and how this affects not only their recreational attitudes, but their travelling and destination choices. Four Wheel Drive Victoria also wanted to asses its own perceptions of the current four wheel drive market and attitudes, with data that is raw, unbiased and collated.

One notable fact that emerged from the surveys conducted within Victoria was that the majority of four wheel drive club members consider 'sustainable driving' the most important aspect of four wheel driving (Taylor 2006). This was encouraging for the association because of its emphasis on sustainability. Across the spectrum of club and non-club members, the primary motivations for four wheel driving were to experience a feeling of escape, or to use four wheel driving as a means to facilitate other activities (Taylor & Prideaux 2006).This finding contradicts many of the portrayals of four wheel driving in the media that foster the idea that the 'action' of four wheel driving is what allures people to this type of recreation.

Information sharing and gathering is a vital ingredient of four wheel drive trip preparation. One object of this research was to assess where information is available and how easily individuals can access it. The focus groups attended by club members identified a need for centralised information depots, especially for information about access and permits required in desert regions. Many club members gather their information from travellers within their recreational scene; the internet is another avenue. However, it is believed that many non-club members are disengaged from a 'recreational community' and it is unclear where they gather their information, if at all. This may explain a major concern outlined at the focus groups: many club members are unsatisfied with the current educational information available to first-time four wheel drivers and state that there is an increasing need to assist novice, uneducated or misinformed travellers whilst en route.

Another encouraging revelation is that only a small percentage of four wheel drivers immerse themselves in the 'hardcore' aspects of the recreation. Although this is the general understanding of the association, a different impression of four wheel drivers may result from the media attention this small group enjoys. It is also interesting to note that this small percentage seldom enjoy desert trips and is often associated with a younger demographic (Taylor & Prideaux 2006).

The research gathered during the initial phase of this project is invaluable, not only to help determine the future direction of four wheel drive bodies, but also to assist future land managers and tourism businesses cater to the needs of four wheel drive tourists.

Zac Powell

Four Wheel Drive Victoria, 2007.

Desert peace – a short story by Jo Connaughton

(Winning entry from the Tales from the Track Competition)

The raucous cries of the corellas greeting the new day filter into my consciousness. Even in my sleepy state I can feel the bitingly cold morning air that follows a perfectly clear, cloudless night in the desert. The weak winter sun is peeping over the horizon. Soon it will start to warm away the bitter chill. I know it will be another perfect day.

Reluctantly I rise from my cosy nest in the single room tent that I share with my husband and four children. I dress quickly in my dusty, much worn clothes. I placed them under my pillow last night to keep them warm for this moment. The cold makes my hands hurt. I pull on my beanie and gloves and hurry out into the brisk morning to rekindle the fire. I toast my hands by the low flames, listening to the early morning calls of the birds and savouring the soft, pink hues of the approaching day.

In the strengthening light I hear the muffled sounds of my family beginning to stir. My parents exit their adjacent tent and approach the fire hoping that its warmth and a steaming morning cuppa will stave off the winter chill.

We are camped in the idyllic setting of Well 31 on the Canning Stock Route. We have travelled from Wiluna over the last 2 weeks in our two vehicles. My husband and I travel in our HJ 60 Landcruiser wagon with our four sons aged 11, 10, 7 and 5. My parents, both aged 68, travel in theirs. We have eaten two-thirds of the food supplies now and the children no longer have to travel with boxes of fruit and potatoes under their feet.

We feast on cereal and steaming hot billy tea as the sun gathers strength enough to entice us to shed our beanies and gloves. It seems hard to imagine that by lunchtime we will be wearing shorts and Tee shirts and be seeking out the shade. We are not breaking camp today and relish our leisurely preparations to explore the abandoned site of the second Well 31. Armed with GPS and maps we clamber into our vehicles and make our way east.

Shortly we arrive at a clay pan bordered by sapphire and a few small trees struggling to survive. I wonder why the second wave of well builders thought that this might have been a better water source than our campsite, under the majestic towering gums. Scanning the desert beyond the clay pan I can only see red dirt, sapphire and spinifex, broken occasionally by a stunted, gnarled tree. I find it hard to imagine anybody finding any water in this environment. We find some pieces of rusted trough lying about. All that remains of the well. This is an unforgiving place.

Over the last few weeks we have stopped by many Aboriginal soaks. These are usually clumps of stumpy Acacia or Mulga trees rising above the spiky golden spinifex and harsh red dirt. The trees form a circle that hides a small darker red depression. The Aboriginals know that by digging here they will find moisture enough to quench a parched traveller's thirst. I am constantly amazed at the ingenuity of our earliest dwellers for I surely would die of thirst out here.

Back at camp the sun is riding high in the sky. Her rays are stronger and we have shed our outer layers. The children, like lizards, come to life with the welcome warmth and begin to explore our campsite. Their squeals of delight complement the chatter of the desert finches.

The harmony is broken by the sound of an engine. We have visitors! Who are they? How many of them are there? Will they love this spot as much as us? Will they have children?

We gather and await their anticipated arrival. We wait excitedly. The grunt of the engine gets louder as they approach! We wait expectantly. The note of the engine changes as they approach the turn off. We wait hopefully. The grunt of the engine gets softer? We wait confused. The sound of the engine is gone.

Can they have passed by? Did they drive all this way and not take the short detour off the main track to explore the well site? This is one of the prettiest spots and they have missed it! What a waste! I shake my head baffled.

The explorers have found a treasure in the campsite. An abandoned 60 litre drum. The littlest acrobat lays it on its side and rolls over it then the bigger acrobats stand on it and 'walk' it. Soon it is the fulcrum for a see saw made from a fallen branch. After being used as the roller to prepare the wicket it becomes middle stump. Grandad umpires the 'test match' and Nanna is the spectator on the 'hill'. Now the 'Socceroos' use it as part of a goal at the end of the 'pitch'.

The corellas return to roost in their trees. Their harsh cries shatter the afternoon stillness. The sun loses its intensity and once again we don our outer layers. As the light fades fast we turn to the east to see the dark shades of the night sky creep up from the horizon and march across the sky, overtaking the daylight. As one we turn and follow the line westward, watching the last of the day slide away and the stars begin to shine. The aroma of roast lamb fills our senses and we sit by the fire, hungry as the camp oven is removed from the coals. A sumptuous feast awaits.

The blackened camp oven lies empty. The hushed night noises of insects and crackling fire mingle with our quiet chatter. The youngsters search the heavens for satellites and meteors. They read the time on the Southern Cross clock. One by one we retire sleepily to our warm beds, contented at the end of another peaceful and magical day in the desert.

Executive summary

The On Track research program aimed to identify how the proper management of four wheel drive (4WD) tourism could contribute to the livelihoods of desert people. The program was initiated as a result of the recommendations of a 2004/05 scoping study commissioned by the Desert Knowledge Cooperative Research Centre (DKCRC) that found that research into the 4WD market could contribute to the development of a viable tourism industry in the desert. On Track was led by Dr Dean Carson from Charles Darwin University. A wide range of research institutions, government bodies, private sector companies and consumer interest groups contributed to the research.

On Track research was specifically designed to examine four issues:

- how to increase the incentives for 4WD visitors to spend money in desert areas and consequently provide greater benefits to desert settlements
- how to protect cultural, social and natural values from the impact of 4WD tourism
- how to encourage safer and more appropriate driving practices in order to reduce the barriers to consumer participation in 4WD tourism and the costs of its management
- how to achieve better coordination of the marketing and management of desert 4WD tourism destinations.

The research program was structured around four themes:

1. The **information management** theme identified and collated the existing data sets related to 4WD tourism in desert Australia, designed instruments to collect missing data and identified ways to represent data using geographic information systems (GIS) and other tools. A trip patterns survey (4WD travellers in the desert), spatial analysis of trip itineraries and route selection modelling were undertaken.

   On Track researchers found that stakeholders need information for two main purposes:
   * monitoring and management, which requires information about the number and distribution of 4WD travellers across desert Australia
   * marketing and product development, which requires more qualitative 'market insights' to help destinations and businesses maximise their competitive advantage.

2. The **market analysis** theme profiled 4WD travellers and identified their product and experience preferences. The bulk of the primary research conducted for On Track was concerned with market analysis. This research included focus groups, surveys, in-depth interviews, a story competition and analysis of travel blogs and club newsletters.

   The research indicates that the development of 4WD tourism has been focused on the major desert 'tracks' and relatively long trips by (primarily domestic) travellers looking to 'conquer' those tracks. Other markets have received less attention; they include travellers looking to participate in special interests (such as bushwalking, bird-watching, fossicking and art), travellers looking to test their driving skills and vehicle capabilities and 'novice' 4WD travellers looking for relatively short, supervised experiences.

3. The **innovation and capacity** theme examined desert destinations' readiness to capitalise on the potential offered by 4WD tourism. Interviews with tourism operators and managers and a review of policy documents and grey literature were undertaken.

   Researchers found that tourism product supply in desert Australia has become homogenous for a variety of reasons and fails to exploit the diversity of the market.

4. The **responsible travel** theme documented issues that relate to safety, land access and culturally appropriate behaviour. Secondary data sources, travel blogs and club newsletters were analysed, surveys undertaken, policy documents and grey literature reviewed.

There is little evidence that 4WD tourism has had any substantial negative impacts on the environment or desert communities. However, researchers note that even a small number of high profile incidents can create the perception that 4WD tourism brings with it costs that exceed its benefits. A great deal of investment has been made in educational material for travellers, but it is not clear whether the message is being received and acted on to the desired extent. New information and communication technologies may offer opportunities to develop more effective information and education programs.

Preliminary findings from this research include:

- An expanded range of products and services packaged as preferred by 4WD travellers and an increased awareness of the products and services that are available in desert areas may provide 4WD visitors with a greater incentive to spend their money in the desert. Products and services should be available when the traveller wants them, rather than on rigid schedules that are more appropriate for the organised tour market. Products and services should allow access to more of the natural environment, provide education about the significance of that environment (particularly for people travelling with their families) and be able to be consumed by small groups.
- Protection of cultural, social and natural values from the impacts of 4WD tourism will be enhanced by more effective systems for managing access to land and by providing education about environmental, cultural and social practices. Increasing the regulation of travel behaviour is unlikely to be effective because regulations are difficult to enforce. On the other hand, providing information about the environmental, cultural and social values of desert landscapes may enhance many people's travel experiences.
- Better driver education may lead to safer and more appropriate driving practices. The provision of this education also provides income. Existing desert businesses already provide these products, particularly to novice travellers. Hire car companies are critical stakeholders in this education process. The use of in-vehicle technologies may allow the distribution of information about weather and road conditions as well as improving communication between travellers and emergency services.
- There are untapped avenues for the promotion of desert tourism businesses. 4WD travellers use entirely different sources and styles of information to plan their trips than those currently used by desert tourism businesses to promote their products and services. Attention must be paid to how products can be packaged and promoted more effectively to the more independent 4WD markets.

Research can continue to contribute to the sustainable growth of a desert 4WD tourism market. There is an urgent need to establish data collection systems that provide better market insights and allow monitoring of the marketplace over time. The On Track project will contribute by developing the Visualising Relatively Unpredictable Movements (VRUM™) GIS which will show the spatial distribution of visitors across desert Australia, identify the distribution of specific market segments and model the impacts of various events on these distributions. On Track will also contribute to research into technologies that can facilitate product distribution and visitor management through two way in-trip communications.

Benefits will flow from 4WD tourism in desert Australia to the businesses and communities that maximise their understanding of the tourism industry. There is a potential for profitable businesses to be developed that meet the particular needs of different types of 4WD travellers.

1. Background

The On Track research program was an initiative of the DKCRC, which has its headquarters in Alice Springs in central Australia. The DKCRC is a research agency that links researchers from 28 partner organisations. Its focus is on creating useful outcomes with commercial applications for desert people, communities and partners. Specifically, the DKCRC exists to:

- provide sustainable livelihoods for desert people that are based on natural resource and service enterprise opportunities that are environmentally and socially appropriate
- encourage sustainable remote desert settlements that support the presence of desert people, particularly remote Aboriginal communities, as a result of improved and efficient governance and access to services
- foster thriving desert regional economies that are based on desert competitive advantages, bringing together Aboriginal and non-Aboriginal communities, government and industry
- apply social science insights into governance, human capacity and the design of appropriate institutions to all these outcomes.

(DKCRC 2008)

In 2004, the DKCRC funded a desert tourism scoping study (Tremblay 2005). The major recommendation of this project and its associated workshop was that a comprehensive research project should be undertaken to look systemically at developing the drive-tourism market in outback Australia. It found that comparatively little integrated research had been conducted internationally about the sustainable development of tourism in desert environments. Notwithstanding this, desert communities express a desire to investigate the contribution tourism could make to their social and economic development. The finding that there is little integrated research does not necessarily mean that no research has been done, but that it is fragmented, poorly focused and difficult to access. The research does not make it clear where general tourism issues end and 'desert specific' issues begin.

Many references to desert tourism in the academic literature come from studies into resource and livelihood management in desert environments. These studies, almost as a matter of course, nominate tourism as a potential source of economic sustenance and tourism development as a strategy for enhancing or sustaining desert livelihoods. While much of the literature recognises the resource management, land use and resource competition issues that may arise from increased tourist activity, there is a tacit acknowledgement that often few viable alternatives exist in remote desert environments. The key drawback of these studies is that they contain only low-level investigation of tourism's real potential to contribute to sustainable desert livelihoods. Tourism is often seen as an industry which is available to, and desired by, all communities in all environments if the right sort of investment and promotion is undertaken.

There are examples of small-scale research into specific destinations that happen to be located in desert or arid areas. Research has examined the process of tourism development, the implications of tourism development on natural resource management and the types of activities that tourists might want to undertake in these sorts of environments. The scoping study identified a number of activities:

- viewing exceptional geographic features or ancient or unusual vegetation – we can see this in Australia at iconic places such as Uluru, Watarrka and the Devil's Marbles
- viewing wildflower or other climate-induced special features – there is a small wildflower viewing industry in desert Western Australia and visitors join the birds that flock to Lake Eyre when there is heavy rainfall in that part of arid Australia
- trekking either by animal, motorised or self-propelled vehicles
- visiting oases
- learning about Aboriginal residents and the history of the settlement of desert environments
- visiting and traversing iconic tracks such as the Birdsville Track, the Canning Stock Route and several of Len Beadell's 'highways'.

The scoping study concludes that the development of sustainable tourism industries in desert environments presents significant challenges to communities and resource managers. It can be compared with undertaking mining or pastoralism: the presence of the raw materials – be they a spectacular landscape or fascinating culture – are only the start of the journey towards a successful industry. The study identified some issues that may arise when turning a 'raw material' into a successful tourism industry:

- Visitors tend to congregate at a relatively small number of attractions of a particular type and the demand for further attractions of that type diminishes rapidly.
- The services that allow an asset to become a product involve a complex mix of businesses, skills and equipment and there is as great a task involved in attracting these elements as in attracting the tourists themselves. Haslam McKenzie (2007) found that good quality housing is important to attract and retain employees to live in desert settlements.
- The costs involved in attracting and servicing tourists in remote areas may be greater than the income that can be expected to come from those tourists who do come. This has particularly been found to be the case when remote communities engage in tourism with the expectation of community level economic returns. A 'successful' tourism enterprise is more commonly characterised by individuals or private companies that transfer some of the costs (particularly infrastructure costs) to the community or the economic system as a whole. Local governments in places such as Byron Bay, Broome and Lorne experience this phenomenon and there is no evidence to suggest that desert tourism is inherently different.
- Unless and until large-scale infrastructure is put in place in desert areas, tourism will remain a small-scale venture. This is often desirable from the point of view of protecting sensitive physical and cultural environments; however, the small size of desert settlements mean that it is difficult to achieve a sufficient critical mass of activity and income to inspire the ongoing innovation that is required to maintain destination competitiveness.
- Many of the landscapes of interest to tourists are spread across pastoral and Aboriginal land and protected areas. The managers of these areas may have different priorities and agendas, particularly when tourists are seen as simply using the land to get from one place to another or as exploiting its features without contributing to management costs.

The documentation of these challenges to the development of viable tourism industries in the desert highlights the role of research. Research can develop a model of the ways in which desert tourism can be successfully and sustainable. The key factors include:

- Aboriginal involvement
- visitor dispersal including infrastructure, access, gateways and transport
- the nature of desert tourist markets
- the relationship between changes in tourist populations and changes in resident populations
- land use, land zoning and access to land
- resource management protocols
- business cycles, competition, cooperation and innovation
- collaboration and cooperation within and across administrative boundaries.

The DKCRC tourism scoping project identified the self-drive tourist market as a particular opportunity for the development of desert tourism. Over 75% of all visitors to destinations in regional Australia travel in their own or rented vehicles (Olsen 2002). Within this large number of self-drive tourists are groups looking for new destinations, who are willing to disperse and for whom the travelling is part of the trip experience, not just a means of transport. Four wheel drive tourists are one example of this kind of traveller, and they may be a particularly useful market given the lack of road transport infrastructure and the challenges that face tourists wishing to travel the long distances in desert Australia. A workshop was held in Alice Springs in early September 2005 specifically to examine how research could contribute to the conversion of potential 4WD tourism ventures into sustainable livelihoods for desert people. The workshop resulted in a 'draft research framework' which identifies research needs: describing and monitoring the marketplace (consumers, businesses, assets and management issues), understanding the implications of changing patterns of visitor behaviour, investigating how

communities might develop resilient tourism businesses in the 4WD marketplace, identifying the education and training needs of consumers and product suppliers and designing improved infrastructure (hard and soft) and technologies to service the marketplace.

It was recognised at the workshop that the nature of the marketplace is poorly understood and that the management tools for businesses, communities, consumers and government could not be developed without an improved understanding of the marketplace. A detailed understanding of the dynamics of the marketplace and the implications for sustainable livelihoods requires a multi-disciplinary research program. The key disciplines include economics, geography, information science, sociology, psychology, marketing and management, political and legal sciences and regional planning. The Alice Springs workshop established that a 4WD tourism research program should broadly investigate:

- settlement/community assets, products, attitudes and experiences
- consumer segments, travel patterns and behaviours, expectations, expenditure patterns and experiences
- drive trails, associated products and methods of access
- the industrial/economic system supporting 4WD desert tourism
- natural and cultural resource use
- infrastructure use (hard and soft infrastructure).

In the final quarter of 2005, funding for an 18-month research project was approved and a project leader (Dean Carson) appointed. In January 2006, a full-time research fellow (Andrew Taylor) commenced work on the project. During the first half of 2006, On Track project management structures were established and a steering committee convened to inform and oversee the research program. This group was established with the support of a range of representatives from industry, government, desert settlements and land management agencies including:

- Arltarlpilta Community Government Council representative
- Central Land Council
- Direct 4WD (Alice Springs)
- Northern Territory Parks and Wildlife Service
- Four Wheel Drive Victoria
- Hema Maps
- Global Gypsies Adventure Tours (Perth)
- Tourism NT.

Tourism NT agreed to provide financial and in-kind support for the project through its existing research relationship with Charles Darwin University. Significant additional in-kind support was garnered from several research institutions including Charles Darwin University, Curtin University of Technology, James Cook University, Murdoch University and the CSIRO's Centre for Arid Zone Research. Research activities commenced in earnest in January 2006 with the scope of the first stage of the project focused on activities that might bring value to end users. This document summarises and discusses the outcomes of the research undertaken during this period. It embodies a large amount of valuable work undertaken by the On Track researchers, steering committee members and their organisations and the stakeholders from across the country whose input to the project has been pivotal to its success. Detail of the research methods is provided in Appendix A, and a list of the project outputs (current at February 2010) is provided in Appendix B.

2. Introduction

Demand for off-road and 'outback' experiences in desert Australia is reportedly growing. However, we know very little about how desert people can translate this potential tourism into sustainable livelihoods. Previous research has largely involved isolated case studies, without a real conceptual structure to guide the meta-analysis of research findings. Desert people want to know how to balance the benefits and costs of increasing visitor numbers to remote, culturally and environmentally sensitive places. On Track examined the potential economic and social benefits of 4WD tourism and assesses the pressures and impacts on the environment, culture and infrastructure in the desert. On Track recognised that a research-based examination of the sector must be cognisant of the complex systemic interactions between 4WD travellers (the consumers), desert communities (the hosts) and the businesses and organisations that directly or indirectly service or support the sector (suppliers).

There are a number of anecdotal claims about the importance of 4WD tourism to desert areas and similar contentions about the potential for growth in the market. However, it is insufficient to expect that growing numbers of 4WD travellers in desert Australia will automatically benefit local or regional economies in the short or long term. A number of scenarios might play out as the market develops, but there is little or no existing research that assesses the current status and behaviour of the market and what will happen if growth occurs. For example, consumers might be willing to consume the types of products and services that are offered by desert businesses; equally they might adopt a self-sufficient approach to travel and be relatively uninterested in purchasing these products and services. Such scenarios can be framed in terms of opportunities and constraints for the sector and are useful to help decide the areas where research is required to assess the current status and likely future developments (Figure 1).

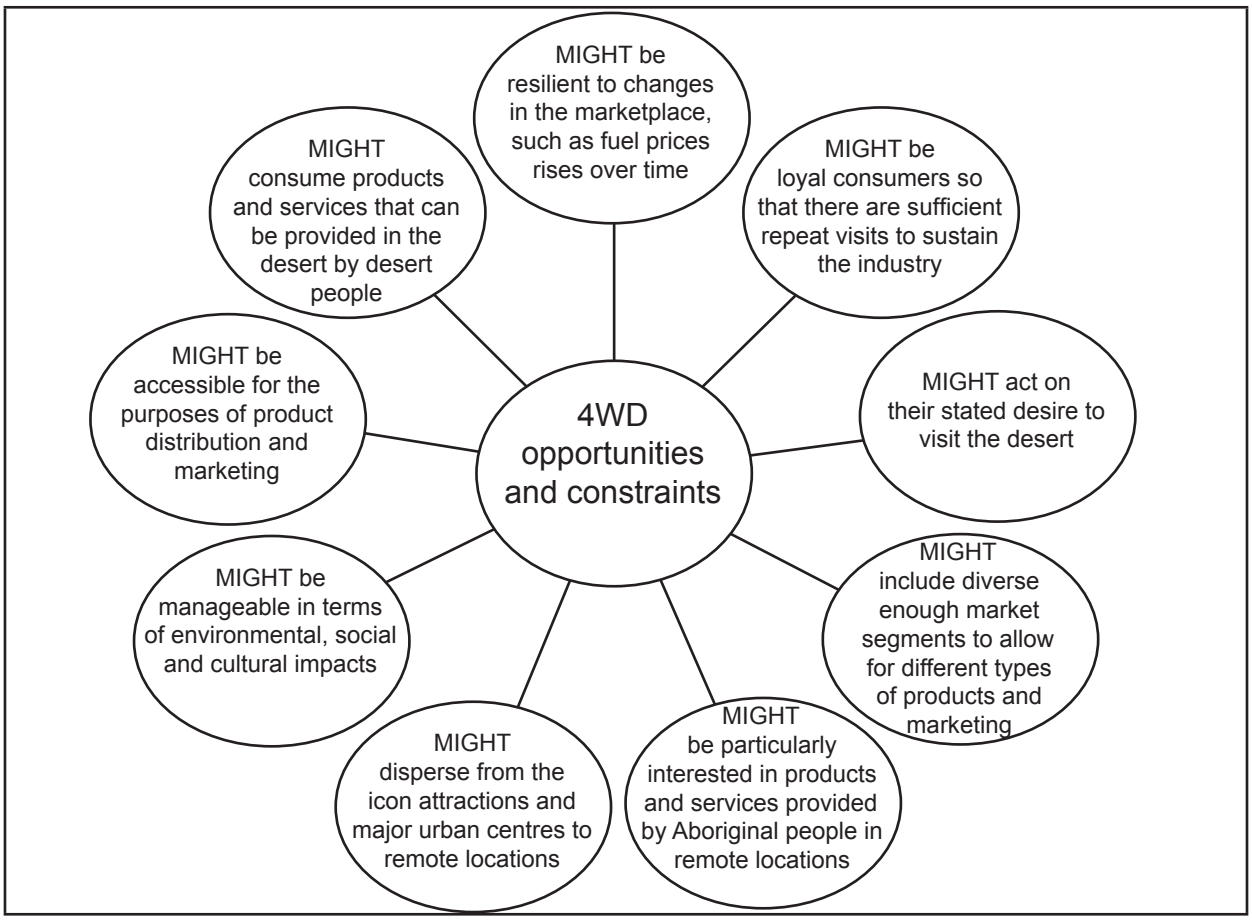


Figure 1: 4WD tourism – opportunities and constraints

The diversity of circumstances of desert economies and of the people who make up desert communities may be seen as an enabler of applied research, where outcomes can facilitate a system-wide understanding of the circumstances under which tourism might contribute to desert livelihoods. A system-wide understanding is crucial to assess the potential for development and the likely impacts of 4WD tourism in a range of scenarios.

The On Track project was organised around four research themes:

Information management: This theme identified and collated all the existing data sets related to 4WD tourism in desert Australia, designed instruments to collect missing data and identified ways to represent the data using GIS and other tools.

Market analysis: This theme profiled 4WD travellers and identified their product and experience preferences.

Innovation and capacity: This theme examined the preparedness of desert destinations to capitalise on the potential offered by 4WD tourism by identifying and articulating the systemic interactions that impact on the competitiveness of desert economies and on the potential for 4WD tourism to contribute to desert livelihoods.

Responsible travel: This theme documented the issues that relate to safety, land access and culturally appropriate behaviour on the part of all stakeholders in the desert 4WD system.

The overarching goal of this project was to collect the information needed by desert settlements, government agencies, the tourism industry and consumer groups to make decisions about investments in, and responses to, 4WD tourism activity. The research framework is set out in Figure 2.

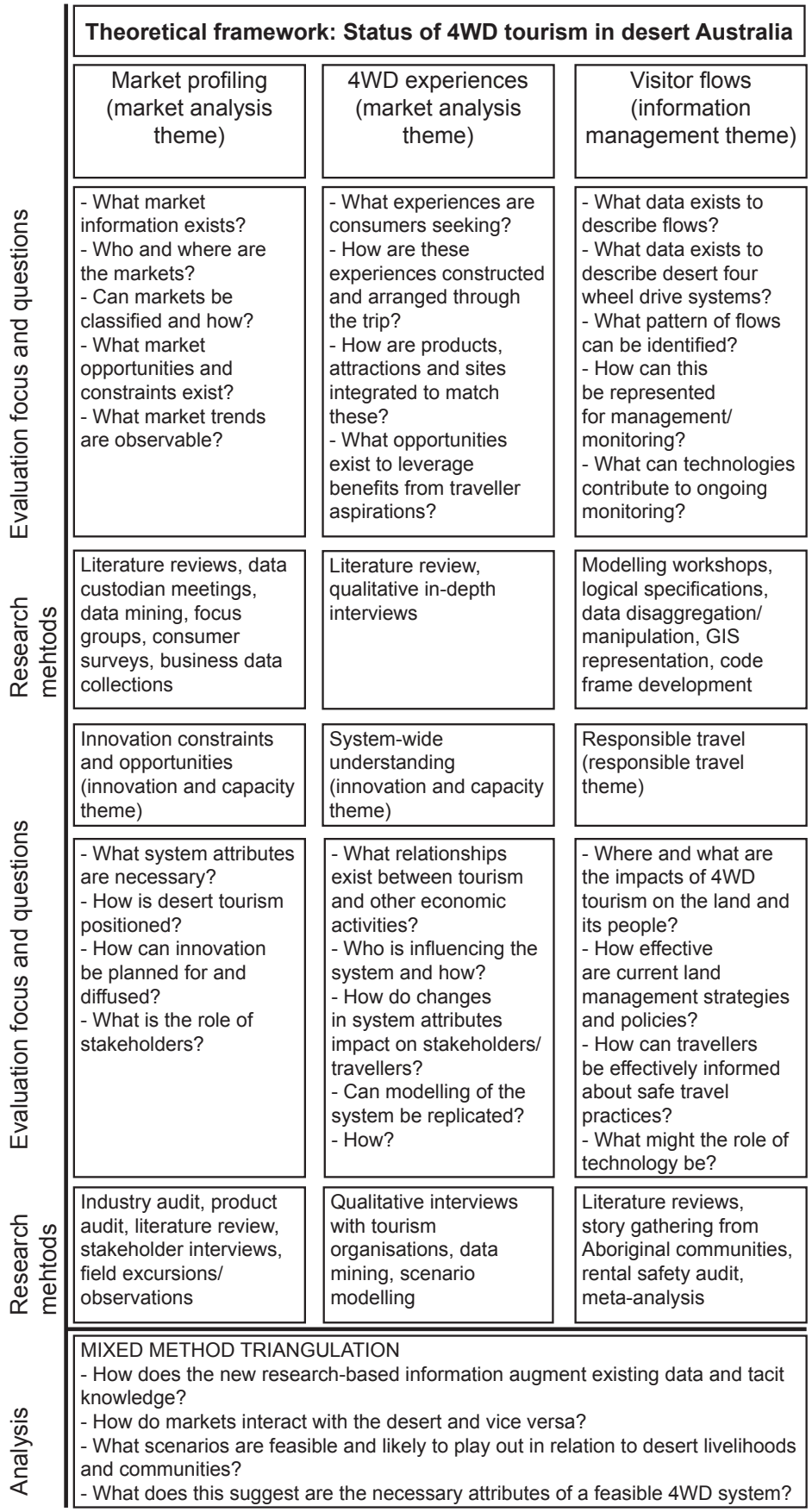


Figure 2: On Track research framework

3. What is 4WD tourism?

Defining 4WD tourism is not a straightforward task. One of the main reasons is due to the complex and changing relationship between the vehicle and how travellers perceive that it fulfils their aspirations for leisure-based trips. A starting point might be to define what constitutes a 4WD vehicle and combine this with an accepted definition of the 'activity' of tourism. However, this is not a clear-cut process either. While the (ABS) collates data on new motor vehicle registrations on behalf of the states and territories, information about specific vehicle features – such as the capacity to engage all four wheels – is not collected (ABS 2006). Instead, vehicles are classified according to its tare and number of axles as follows:

- passenger vehicles
- light commercial vehicles
- trucks
- buses
- motorcycles
- vehicles with diplomatic and consular plates
- state- and Commonwealth-owned vehicles.

The Federal Chamber of Automotive Industries classifies vehicle types according to vehicle design, size, style, weight and clearance. The categories are passenger motor vehicles, sports utility vehicles, light trucks and heavy trucks (Federal Chamber of Automotive Industries 2007). Four wheel drive vehicles are classified as sports utility vehicles (SUVs) and are sub-classified as either compact, medium, large or luxury (Table 1). It is worth noting that the SUV category includes all wheel drive (AWD) vehicles as well as those with the capacity for 2 and 4WD.

Table 1: SUV Categories

SUV Category	Design	Engine	Driven wheels
Compact	Wagon	4–6 cyl.	2/4 & AWD
Medium	Wagon	4–8 cyl.	2/4 & AWD
Large	Wagon	6–8 cyl.	2/4 & AWD
Luxury	Wagon	4–12 cyl.	2/4 & AWD

Source: Federal Chamber of Automotive Industries 2006

A definition of 4WD tourism based on vehicle specifications such as these does not account for any role the vehicle plays in shaping the aspirations and experiences of tourists. It is not a new concept to link the vehicle to the product market. Scott (2002) and Laws and Scott (2003), for example, describe situations where the vehicle helps define the experience, while Hardy (2003) and Ware and Budge (2002) explain how touring routes and attractions might be designed to promote the link between transport and experience. Four wheel drive tourism may be expected to have a particularly strong link between product and market (Scott 2002) because the vehicle is essential to access destinations and undertake desired activities. Travellers can undertake specific activities (like fossicking, fishing or bushwalking) that require the storage, off-road and power-related capabilities of a 4WD vehicle.

Evidence suggests that consumers view the vehicle as key to the travel experience. This is indicated by the proliferation of 4WD recreation clubs across Australia and internationally (Hall 2006). Many destinations and tourism product suppliers distribute experiences with 'four wheel drive' in their name (and with infrastructure specifically targeted at 4WD travellers). There is also a facilitating industry of vehicle manufacturers, accessory providers and others who market their services by explicitly linking the vehicle with the notion of tourism. These conditions appear to fit with Scott's ideas about product markets in tourism (2002). This theory proposes consumers and suppliers share a set of concepts that enable them to interact in the marketplace (Rosa et al. 1999).

A simple definition of 4WD tourism is: 'Tourism experiences which the consumer and supplier perceive as heightened in value by the use of 4WD vehicles.' This definition allows for experiences to be on or off-road, to be completely dominated by use of the 4WD vehicle or for that activity to be part of a larger trip experience. The dialogue between consumers and suppliers (and other organisations) helps construct a language about an experience so that the definition becomes meaningful to all parties (Aaker & Joachimsthaler 2000). There is evidence that this has occurred in relation to 4WD tourism in Australia. The shared language allows consumers to think about taking '4WD trips' and the tourism industry to think about offering, promoting and managing such trips.

Taking another angle, Rollins (2006) pays particular attention to how the dialogue between 4WD vehicle manufacturers and consumers is strongly connected to the environment and environmentalism. The distinction between leisure and tourism is becoming increasingly blurred – a point recently highlighted by Jennings (2007) in relation to water-based leisure, recreation and tourism – there is scope for a wide range of interpretations of 4WD tourism.

Following from the above definition of 4WD tourism, other definitions are necessary to describe complementary elements:

4WD vehicle – A vehicle with drive train components and user functionality that enables all four wheels to be engaged (can include AWD or 4WD vehicles).

4WD trip – A trip that includes at least one segment where a 4WD vehicle is perceived as enhancing the travel experience.

4WD traveller – A person who has been on, or is on, a trip for which the primary motivation is leisure or leisure-related activities, and where the trip includes segments of travel where a 4WD vehicle is perceived as enhancing the travel experience.

4. Australian deserts

While there are many definitions, a significant proportion of the Australian land mass can be described as desert. Geosciences Australia (2006) reports that land areas with an official title that incorporates the word 'desert' account for 18% of the Australian continent, and approximately 70% of Australia's land mass receives less than 350 mm of rainfall per annum, which is their classification of arid or semi-arid land (Figure 3). The environmental and landscape characteristics of Australia's deserts are varied, as is the flora and fauna they host. Among the named deserts there are landscapes of shifting red sand dunes (for example, the Simpson Desert that traverses three state boundaries), extensive gibber (stone) plains (Sturt Stony Desert) and the massive saline lakes found in the Gibson and Tirari Deserts. Even within individual deserts, the flora and landscapes can be exceedingly varied in their types and distribution.

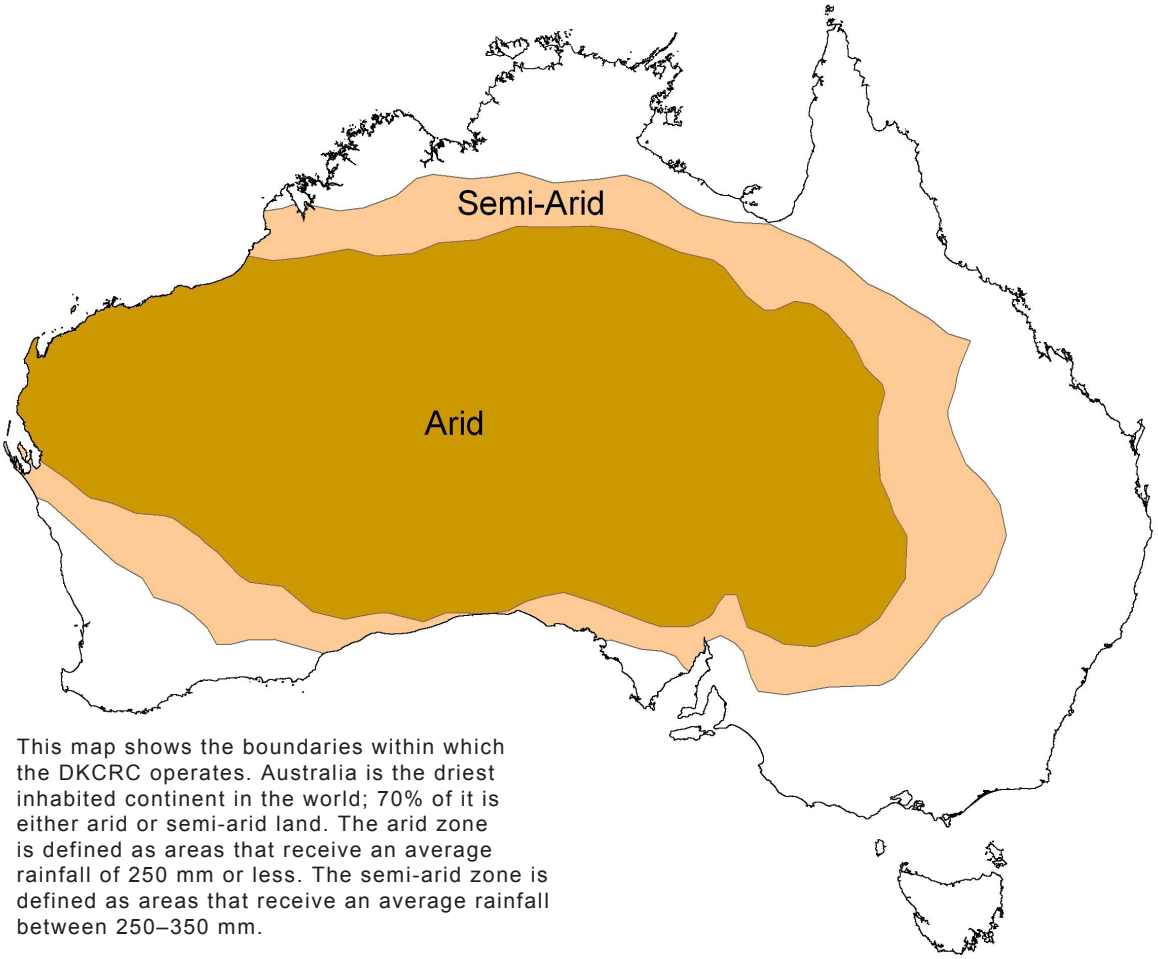


Figure 3: Australia's desert areas

Source: DKCRC 2007

Remoteness from major population centres is a feature of Australian deserts. According to the Accessibility/Remoteness Index of Australia (ARIA), which is based on road distance measurements from 11 879 populated localities to the nearest service centres, less than 3% of Australia's population lives in the remote or very remote locations that account for approximately 70% of the land mass. Distances to key source and product markets mean that, outside of the mining and agricultural sectors, structured and well-coordinated economic activity is typically small and fragmented (Desert Knowledge Australia 2005). Businesses usually have less than 20 employees and their ability to influence broader economic outcomes may be limited (Bala & Goyal 1994). Tourism is widely viewed as an avenue for economic development, despite the marginal economic conditions found in many desert regions.

Australian deserts have a rich cultural heritage. Important pioneering developments and events that have occurred in desert areas have shaped the social fabric and industrial organisation of the country. Queensland and Northern Territory Aerial Services (QANTAS) was, for example, originally conceived to deliver mail to the desert-based towns of Cloncurry and Charleville, and their first office was located in Longreach in Queensland. Among other important pioneering achievements in Australian history, there is the forging of a series of desert tracks through some of the most inhospitable terrain and under sometimes severe conditions (Hema Maps 2001). One well known example is the Canning Stock Route, which is considered to be one of the toughest and most remote tracks in the world (Gard & Gard 2004). It runs from Halls Creek to Wiluna, both in Western Australia, and crosses the Great Sandy Desert, the Little Sandy Desert and parts of the Gibson Desert. In the beginning of the twentieth century cattlemen from the Kimberley area were seeking a path across these deserts to herd their cattle to markets. Between 1906 and 1910 Alfred Canning surveyed the route and sunk a total of 52 wells. The route was used for the first time in 1911 (ExplorOz 2007).

Many other tracks have firm historical 'identities' as part of the history of exploration and development of Australia's outback. In the popular 4WD literature, these tracks feature prominently and are marketed as destinations in their own right. Examples include guide books such as those produced by Westprint (see www.westprint.com.au), map sets such as those produced by Hema (see www.hemamaps.com.au), and driver education material such as Gregory's 4WD Survival Guide (Basham 2005). Accepting that 4WD tracks can be considered tourism destinations (Cartan & Carson 2009), desert Australia may have between 7 and 20 of these widely recognised destinations (Basham 2005, Hema Maps 2006). These include the Tanami Track, Gunbarrel Highway, Strzelecki Track, Oodnadatta Track and Birdsville Track (Figure 4).

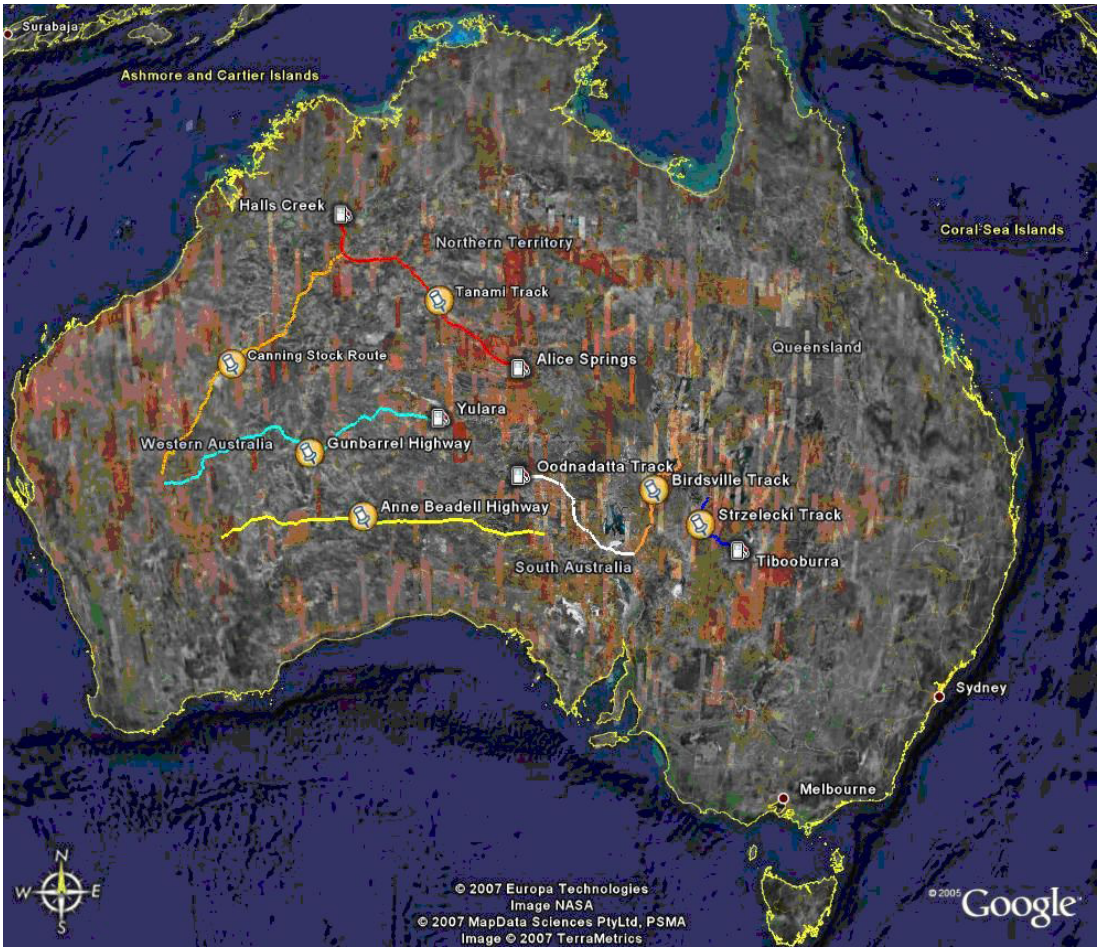


Figure 4: Selected major desert tracks in Australia

5. Literature review

Taylor and Prideaux (2006) have commented that a high proportion of desert travellers use 4WD vehicles and claim to participate in 4WD activities. They describe a market that can be segmented in a number of ways, according to visitor origins, the main motivations for the trip and the way in which the trip is organised. Their report includes anecdotal (and some statistical) evidence that the numbers of 4WD travellers in the desert are growing, which runs against the overall trend for tourism in outback Australia (Desert Knowledge Australia 2005). Elsewhere in the outback, visitor numbers are static or declining, and key markets (such as the backpacker market) also appear to be in decline. Key yield indicators such as length of stay and visitor expenditure have also been flat or decreasing since the late 1990s. Desert tourism stakeholders are obviously interested in strategies to address this situation and Desert Knowledge Australia's Our Outback report (2005) started to identify what some of these may be. At the heart of the report is a call for change: change in the types of products on offer, change in approaches to marketing (particularly collaborative marketing across state/territory borders) and change in the structure of industry/government/consumer networks to ensure adequate participation by all stakeholders.

There has been limited attention paid to 4WD tourism in the academic literature. Priskin (2003a) discusses the environmental impacts of 4WD vehicles on the coastal dune system in central Western Australia. Several other articles (for example, McKercher & Robbins 1998, Priskin 2003b, Hercock 1999) mention 4WD transport as an aspect of tourism in particular destinations. These mentions are again in the context of the environmental damage caused by these vehicles and there is little investigation of the characteristics of the visitors using those vehicles. Separating the vehicle from the trip experience is often difficult in discussions about self-drive tourism. 'As a topic for research, the study of drive tourism is a very loosely defined, is not theoretically structured and lacks methodological rigour' (Scott 2002:81). In many cases the vehicle is simply the mode of transport as far as the consumer is concerned and the 'real experience' takes place in other settings. In other cases, however, the consumer sees the vehicle itself as playing a central role in the experience (Derrett 2002). Equally importantly, tourism marketers, intermediaries and product suppliers factor in the mode of transport. Those travelling in vehicles need particular types of product (fuel, of course, but also a particular design of accommodation establishments, rest stops and other infrastructure). It makes sense then to talk about a 'self-drive tourism market', at least in some respects (Olsen 2003).

Taylor and Prideaux (2006) define a typology of 4WD travellers with the vehicle at its core: travellers either used the 4WD to explore places they would otherwise be unable to access, they undertook specific activities (fossicking, fishing, bushwalking or camping) which required the storage and power capabilities of the vehicle as infrastructure, or they explicitly set out to test the capabilities of the vehicle and the driver (and support crew).

It is unsatisfactory to expect that growing numbers of 4WD travellers in desert Australia will, by their very presence, benefit local or regional economies in the short or long term (see Bala & Goyal 1994 for a discussion of how intrinsically viable markets may still fail). Even if we accept that there are a growing number of potential consumers, there is mixed evidence about whether they might:

- act on their stated desire to visit the desert
- consume the sorts of products and services that can be provided in the desert by desert people
- be particularly interested in products and services provided by Aboriginal people in remote locations
- disperse from the icon attractions and major urban centres
- include diverse enough market segments to allow for different types of products and marketing approaches
- be accessible for the purposes of product distribution and marketing
- be manageable in terms of environmental, social and cultural impacts
- be loyal consumers so that there are sufficient repeat visits to sustain the industry over time
- be resilient to changes in the marketplace (including economic factors such as fuel price rises).

Competitive product markets

Desert destinations interested in attracting 4WD visitors must engage with a competitive marketplace where factors relating to both supply and demand determine success (Crouch & Ritchie 1999). While there is a growing body of literature devoted to the concept of 'destination competitiveness' (see for example, Kozak & Rimmington 1999, Enright & Newton 2005), it is not entirely clear what it means to be competitive or how to assess the competitiveness of specific destinations. Competitiveness in the economic sense is a comparative term, reflecting the performance of one marketplace against another. There are very few studies of competitiveness in tourism that compare destinations with one another on the basis of specific product markets. Even if comparisons are conducted (the most notable example being Enright & Newton 2005), the selection of competing destinations is problematic. Enright and Newton select three Asian destinations for comparison based on their geographic and 'tourism life cycle' attributes. This may be unsatisfactory because visitors of any particular type are faced with the choice of many destinations of different types (Huybers 2003) that might achieve their goals and are also faced with the choice of travelling as a different type of visitor (Diaz-Martin et al. 2000) or not travelling at all.

The competitiveness of markets for products such as 4WD tourism may be determined both by the alternative destinations identified by travellers and the range of destinations seeking to service this market (Scott 2002). Taylor and Prideaux (2006) noted that 4WD travel enthusiasts were at least as interested in visiting alpine, beach, and rainforest environments as they were interested in desert environments. There does not appear to be any greater level of organisation of the market in the desert than elsewhere. Overall, the 4WD product market appears to be a relatively peripheral target of the tourism industry, consistent with Olsen's view (2002) that there is a lack of attention paid to the self-drive tourism market in general.

In some ways, the absence of well-developed supply chains for 4WD tourism offers an opportunity to desert destinations to stake out a competitive claim. Unfortunately the peripheral nature of the market also results in a lack of information to base investment decisions on, and a lack of 'heterogeneous' experiences in the market that would stimulate entrepreneurship (Bala & Goyal 1994).

The final difficulty in an assessment of the competitiveness of tourism destinations involves defining what it means to have succeeded in the competition. Different destinations will require different outcomes from tourism development (see for example, Carson & Jacobsen 2005) and their success in particular markets must be measured against these local ambitions. Whether tourism 'yield' is measurable in the context of local ambitions is arguable (Northcote & Macbeth 2006), but it remains a challenge for policy makers (Dredge & Jenkins 2003).

There is greater agreement, at least in broad terms, about what attributes determine the competitiveness of tourism destinations. There are broadly three classes of attributes commonly described in the literature. The first class is the tourism attributes that relate to the attractions and amenities and general tourism values of a destination or, in the case of 4WD tourism, the product-market match (Buhalis 1999). The second is the sustainability attributes: how well the environment is equipped to manage the impacts of tourism (Hassan 2000). The third, perhaps most important, but also least understood, is the class of 'such factors that affect the competitiveness of firms and other organisations involved in producing the tourism "product" ' (Enright & Newton 2005:340). Carson and Macbeth (2005) have considered these factors in light of the approach of post-structural economics to innovation in tourism systems. Specific attributes that may be related to each of the three classes are described in Table 2. The list of attributes is by no means exhaustive and 'the importance of these attributes may vary across locations, depending on product mix and target market segments' (Enright & Newton 2005:339).

Table 2: Attributes which may determine competitiveness in a product market

Tourism	Sustainability	Innovation
• Attractions • Accessibility • Amenities • Available packages (i.e. a distribution system using various intermediaries) • Activities • Ancillary services	• Stable political climate • Environmental regulations • Tourism policy • Environmentally friendly investment policy • Facility/land use requirements • Carrying capacity constraints • Environmental promotion programs • Environmental education • Enforcement organisations	• Economic competence • Resource clusters • Networks • Entrepreneurship • Critical mass of consumers and suppliers • Development blocks • Private – public sector interactions or what Dredge and Jenkins (2003:387) refer to as 'institutional thickness' • Production and distribution of knowledge • Social, political and cultural capital

The tourism attributes reflect not just absolute values (that a destination has a particular set of attractions and amenities) but the match between these attributes and the preferences of the target market and the comparative 'pull' of these attributes compared to other destinations (Klenosky 2002). Should the market react favourably, the 'charge' to the desert observed by Taylor and Prideaux (2006) might provide an economic development opportunity. If this is the case, the capacity of the landscape to receive that charge, and of the industry to organise itself to realise the opportunity through innovation, needs to be understood and, where appropriate, enhanced.

6. Methods

This section provides an overview of the range of primary and secondary research methods used by this project. A more detailed and technical description of the methods used is provided in Attachment A.

The project began by identifying and collating secondary data sets related to the 4WD market in desert Australia. These include visitor surveys (the Northern Territory Travel Monitor 2000–2004, the International Visitor Survey 2003–2004, 4WD recreation club membership records), spatial data sets (roads, settlements, tourism businesses, attractions, etc.) and data sets related to vehicle use (such as vehicle sales data, average annual daily traffic records for specific roadways) and industrial activity (such as Sensis databases and the Australian Tourism Data Warehouse). These were analysed in a variety of ways to develop a profile of desert 4WD activity. These data sets' most significant contributions were:

- estimates of the rates of market growth since 2000 (NTTM, IVS, vehicle sales)
- a profile of expenditure and product consumption patterns, particularly compared with other desert travellers (NTTM)
- to the compilation of a GIS that shows industrial activity and available transport routes (various spatial data sets)
- models of the changes in visitor flows around a specific 4WD track (the Mereenie Loop) (NTTM, AADT, ATDW, various spatial data sets)
- descriptions of common travel itineraries and trip structures including travel party types, trip lengths and accommodation preferences (NTTM, IVS).

Analysis of these secondary data sets revealed the gaps in existing knowledge that often affect our understanding of the market. In particular, there is limited information available that allows a segmentation of the market in ways that could assist marketing and management. There is no in-depth information related to trip motivations, expectations and attitudes to desert travel. There is no information about how trips are planned or consideration of responsible travel issues (safety, environmental and cultural practices, etc.). The available data about visitor flows (trip itineraries) is patchy and lacks sufficient geographical detail.

Consequently, a program of primary research was constructed. Because the project was operating within a limited timeframe, the main intention was to develop methods and tools to collect the required data and implement them where possible. Further data collection is necessary to fill the identified gaps, but the project demonstrated the value of the information that can be gathered and describes strategies for building the information base over time.

A mix of quantitative and qualitative methods was used by the research themes: market analysis, innovation and capacity and responsible travel. Many of the instruments collected data that relates to more than one of these themes. Most instruments were designed to collect data from and about consumers; there is scope to consider what further information may be usefully collected from industry, regulators, residents, land managers and other participants in desert 4WD tourism. Most of the surveys were completed by domestic 4WD travellers and particularly experienced travellers (such as 4WD club members and attendees at 4WD exhibitions. There is scope to implement similar data collections with different groups of 4WD travellers, particularly international (and hire car) travellers, travellers who may use 4WDs for only a part of their journey (such as caravanners) and novice or relatively inexperienced 4WD travellers. The full details of data collection initiatives are provided in an appendix to the main report. A summary of the instruments and their implementation is presented here.

A focus group protocol was designed to investigate the motivations for taking 4WD trips, the product and experience preferences of travellers, perceptions of negative aspects of 4WD travel and attitudes towards interaction (personal or commercial) with Aboriginal communities and culture. Two focus groups were conducted with members of 4WD recreation clubs in Victoria. The resulting

insights informed the development of more quantitative consumer surveys. They also led to a broad segmentation of the 4WD market for desert Australia to allow differentiation between the development potential of destinations and marketing strategies.

A short survey instrument was developed to ascribe 4WD travellers to one of the three broad market segments that emerged from the focus group research. These surveys aim to identify the proportion of 4WD consumers that fall into each segment and to determine the level of demand for desert 4WD experiences. The surveys also collected a small amount of information about trip planning and awareness of responsible travel issues. The surveys were implemented at four 4WD or caravan/camping exhibitions in Wandin (Victoria), Brisbane, Adelaide and Sydney. The instrument was refined after each exhibition. The instrument could now be implemented with other groups of 4WD travellers (international hire car travellers, customers of caravan parks, special interest group members, 4WD vehicle purchasers, etc.) to develop a more complete profile of the market.

A more substantial survey instrument was designed to collect information about travel behaviour, trip planning (information sources, extent to which itineraries are flexible, etc.), travel motivations, travel history and preferences for different types of experiences. This instrument provided a detailed picture of a set of 4WD travellers and could be used to monitor changes in market behaviour over time, including responses to new products, destinations and marketing strategies. The survey was implemented with 4WD recreation club members across Australia.

A survey instrument was also designed specifically for implementation with 4WD travellers during their trips. It examined trip patterns and reasons for selecting particular destinations, and matched these with membership of the broad market segments. Importantly, it described expenditure patterns for the trip and for individual destinations visited during the trip. It was particularly useful to enhance the visitor flows application, because it could be implemented during periods of change (new product, track closure, new marketing campaign, etc.) to assess the impact of change on decisions to visit particular places and use particular routes. This survey was conducted with a small sample of travellers (60 in total) at caravan parks in Alice Springs. A more complete implementation strategy will be proposed if the data proves useful for the visitor flows application.

A survey aimed at international 4WD travellers using hired vehicles was designed and piloted in collaboration with Britz Rent-a-Car in Broome and Darwin. This survey was specifically designed to explore the issues related to responsible travel, including the types of information travellers accessed about safe travel, experience of four wheel driving and driver training. German and English language versions of this survey instrument were developed and were distributed during the 2007 high season (June–November).

A range of in-depth interviews were conducted with 4WD travellers in desert destinations. One of these sets of interviews (12 respondents) mirrored the topics covered by the focus groups and was conducted early in the project, again to inform development of the more quantitative survey instruments. Another set (30 in total) was conducted in and around Alice Springs with both domestic (15) and international (15) travellers. This set focused on attitudes to Aboriginal cultural tourism products and the consumption patterns of these products. The aim was to establish whether product design or methods of product distribution could be improved.

In-depth interviews were also conducted with ‘deep desert’ travellers – defined as those with considerable experience with 4WD trips in desert Australia and with a commitment to doing these trips on a regular basis. These interviews sought to identify the values attached to desert travel and the attributes of an ‘ideal’ desert 4WD experience. The interview technique could be replicated with other groups of desert travellers and some work has commenced on interviews with novice travellers (defined as those on their first 4WD trip to the desert).

On Track also invited desert 4WD travellers to write short stories (1000 words) describing their most memorable 4WD trip. Respondents were able to construct the stories in any way they chose, the only parameters being the length of the story and that it needed to encapsulate what made the trip a memorable experience for them. This method of data collection proved successful in identifying a range of factors that contribute to ideal desert 4WD trips. A similar approach might be used with more targeted market segments. The technique could also be adapted to storyboarding, either in the context of a focus group (where a collective story is described) or in individual interviews.

Four wheel drive travellers have additional mechanisms through which they tell stories of their desert travels and provide insights into how these experiences are constructed. Such mechanisms include blogs, club publications (such as newsletters and web sites), 4WD and special interest magazines and other published material. The project developed a set of templates for analysing this sort of material against the research themes. A substantial amount of this literature was assessed for the responsible travel and market insights themes and additional work is being done that focuses on analysing photographs posted on blog sites as part of a PhD project.

Information not directly about consumers was collected from grey literature (including policy documents, research reports and consultancies) and from interviews with tourism operators with an interest in the desert 4WD market. The interviews focused on perceptions of changes in the marketplace and the strategies being used to develop knowledge of the 4WD market. There was no systematic implementation of an industry research program, but 23 interviews were conducted by the research team with relevant individuals.

A range of methods was used to represent spatial information using a GIS. Trip itineraries were recorded in several of the primary and secondary data sets. Itineraries included place names or other information about the location of the destinations visited, in order, during part or all of the trip. In most data sets, destinations were locations where the traveller stopped overnight, although destinations could also be other sites visited (where petrol was bought, a meal was consumed, an activity undertaken, etc.). Information about location was matched with the Australian Standard Geographical Classification and could then be represented on an ArcGIS (a GIS software product) map layer as a region (which might be a statistical local area, tourism region or some other standard classification).

Regional representation was often imprecise, with some regions covering hundreds of square kilometres. Some manipulation of data was required both to estimate a more specific location of the destination and to calculate the most likely route travelled between consecutive destinations. The most popular (most frequently visited or largest) destination and route were selected from all the possible locations. Clearly this is an imperfect solution, particularly for route selection, because 4WD travellers will often select an alternative to the major road between two places. Determining how and when alternative routes are selected and estimating the proportion of travellers likely to have made such selections is an important component of further research for the GIS. The GIS may also include a number of additional layers of information to help contextualise representations of itineraries. These layers may include sites of roads and towns, tourism attractions and infrastructure. A demonstration of the use of additional layers to help interpret representations of itineraries was constructed as a Google Earth application.

Beyond representing the itineraries recorded in the primary and secondary data sets, the project aimed to predict the volume and route selection (including destinations visited) of 4WD travellers in desert Australia based on a number of scenarios. Scenarios may include the opening or closing of an attraction or route, the implementation of a marketing campaign, changes in road quality, weather conditions or tourism events. The VRUM™ model will use GIS to describe the travel patterns that arise from these scenarios. A conceptual framework for the model has been developed and will be tested and made operational in the next phase of research.

Table 3: Summary of research methods

Theme	Method
Information management	Collation and analysis of secondary data sources Trip patterns survey (4WD travellers in the desert) Spatial analysis of trip itineraries Route selection modelling
Market analysis	Analysis of secondary data sources Focus groups (4WD owners) Market segmentation survey instrument (4WD owners) Long-form survey instrument (4WD owners) International hire car travellers survey In-depth interviews (4WD travellers in the desert) In-depth interviews (experienced 4WD travellers) 'Tales from the Track' story competition (4WD travellers) Analysis of travel blogs, club newsletters, etc.
Innovation and capacity	Interviews with tourism operators and managers Review of policy documents and grey literature Analysis of secondary data sources
Responsible travel	Analysis of secondary data sources Long-form survey instrument (4WD owners) International hire car travellers survey Review of policy documents and grey literature Analysis of travel blogs, club newsletters, etc.

7. Results

Parts of this chapter are extracted from academic papers authored by researchers from this project. Extracted text is shown in italics and the source is cited immediately following the text (in brackets). The full citations of these extracts appear in the list of references.

Information management

Few readily available data sets contain information about 4WD tourism in desert Australia. Where data do exist, definitions and geographic coverage vary. The two major national tourism data collections are the International Visitor Survey (IVS) and the National Visitor Survey (NVS). Both have included questions relating to the use of 4WD vehicles, but the data quality has been poor and the sample size for visitors to desert Australia has been low.

The IVS provides estimates in relation to international visitors to Australia through interviews with departing visitors aged 15 years and over at Australia's eight major international airports: Sydney, Melbourne, Brisbane, Cairns, Gold Coast, Perth, Adelaide and Darwin. Survey results are weighted against data provided by the Department of Immigration and Multicultural and Indigenous Affairs for international visitors over the period. Several variables are used to weight the data, including country of residence, main purpose of journey, airport of departure, age and sex of visitor. In 2005 the IVS made a large increase to their sample size. Between 2001 and 2004 interviews were conducted with approximately 20 000 departing international visitors but this was doubled in 2005 to around 40 000 per year in order to increase the reliability of estimates.

IVS respondents are asked to indicate the main form of transport they used between individual overnight stops on their trip and between their point of arrival and their first overnight stop location. Respondents are provided with a prompt card that lists forms of transport, including 4WD. Using this information it is possible to identify the number (and proportion) of respondents whose main form of transport from (at least) one desert stopover to another was self-drive and, in turn, the number who used a 4WD vehicle, including private, rented or tour operators' vehicles. In 2005, for example, 8.4% of the nearly 38 000 IVS respondents had visited desert regions in Australia on their trip. Of these, 64% used self-drive transport to reach at least one stopover in the desert. Only 6.4% of these international self-drive travellers used a 4WD vehicle at some point in the desert. Hence, less than 0.5% of all IVS respondents were 4WD travellers in the desert (Table 4).

Table 4: International desert 4WD records (IVS)

	2001	2002	2003	2004	2005
Total IVS sample	20 383	27 659	20 670	20 648	37 989
IVS desert records	1 102	1 265	1 522	1415	3199
Desert % of total IVS records	5.4%	4.6%	7.4%	6.9%	8.4%
IVS desert self-drive records	n.a	n.a	883	840	2037
Self-drive % of desert records	n.a	n.a	58%	59%	64%
Desert 4WD records	n.a	n.a	61	68	132
Desert 4WD as % of Desert self-drive records	n.a	n.a	6.9%	8.1%	6.4%
Desert 4WD as % all IVS records	n.a	n.a	0.3%	0.3%	0.4%

The NVS collects information about travel by Australians, including overnight trips (of one night or more), day trips and trips by Australians overseas. Each year until 2005 information from around 28 000 respondents was gathered. In 2005 this rose to around 37 000 people. Data from the NVS are

weighted on the basis of age, gender, household size and month of travel; the results are benchmarked against population estimates for people aged 15 years and over to provide estimates about the size and characteristics of domestic tourism in Australia. Importantly, there is no option in the transport questions for respondents to indicate that they used a 4WD vehicle. However, the desert self-drive market can be identified and these records account for close to 80% of all domestic desert tourists (Table 5).

Table 5: Domestic desert self-drive records (NVS)

	2001	2002	2003	2004	2005
Total NVS records	27 662	27 659	26 982	27 948	37 217
Desert % of total NVS records	5.2%	5.2%	5.5%	5.2%	5.3%
NVS desert records	1 446	1 425	1 495	1 454	1 971
NVS desert self-drive records	1 134	1 095	1 174	1 120	1 497
Self-drive % of desert records	78%	77%	79%	77%	76%

Making accurate assessments from these sources about the size of the 4WD market in desert Australia is problematic. However, these datasets represent the best available data, and extrapolations based on visitor transport modes are possible. Crucially, these collections allow comparisons to be made between the self-drive and 4WD markets and other markets in desert Australia, as well as comparisons between the collective desert tourism market and others.

Tourism NT, the state tourism organisation for the Northern Territory, conducted an annual survey of visitors between 1998 and 2004 called the Northern Territory Travel Monitor (NTTM). This survey included questions both about the use of a 4WD vehicle during the trip and whether four wheel driving was an activity that was undertaken during the visit to the Northern Territory. While it is possible to assess whether a 4WD vehicle was used to travel to desert areas of the Northern Territory, it is not possible to assess whether four wheel driving as an activity was done in the desert or elsewhere in the Northern Territory (Table 6). The proportion of respondents who indicated they used a 4WD vehicle in desert areas of the Northern Territory increased during the five years of available data despite a substantial fall in the proportion of all visitors to the Northern Territory who went to desert regions. Data collection was discontinued after 2004.

Table 6: Desert 4WD sample Northern Territory (NTTM)

	2000	2001	2002	2003	2004
Total NTTM records	3 618	3 242	3 317	3 244	3 243
Desert records as a % of all NTTM records	81.6%	81.9%	81.1%	79.6%	72.2%
Number of 4WD desert records	1 318	1 141	1 322	1 166	1 154
4WD as activity on trip (% all records)	25.9%	24.2%	25.9%	22.5%	22.1%
4WD as transport in the desert (% desert records)	34.3%	32.4%	39.2%	37.9%	42.8%

The Northern Territory and each of the states now conduct ‘destination-based surveys’, which are samples of visitors in specific locations. Data items differ from state to state and in some cases from location to location. The destination-based survey program has only recently begun. Pilot collections have been undertaken in Alice Springs and Tennant Creek, but it is not known whether other desert destinations have been included. Data has not yet been released, so it is not known whether any data items relate to 4WD tourism.

There are a number of data sets that describe 4WD 'tracks' and routes. These are generally produced and maintained by map or guide book companies. Hema Maps has perhaps the most comprehensive database; in early 2007 they released an update of their Great desert tracks atlas and guide. The Hema Maps database includes not only tracks and their locations, but the commercial facilities and other amenities available at locations in the desert, and nominates points of interest that can be accessed using the tracks. While there is a great deal of qualitative information about the navigability of tracks and the skills and equipment required to negotiate them, there is no formal classification system.

There is almost no information that compares 4WD tourism activity along different tracks or in different desert destinations. It is likely that there is a lot of local knowledge (held in roadhouses, community stores, camping grounds, etc.) about the type of experiences that are offered by different tracks. This knowledge has yet to be exploited for marketing or management purposes, although there are initiatives that aim to do so, such as the 4WD touring plans being developed by Tourism NT and the South Australian Tourist Commission. Some operators have also attempted to differentiate their products using their knowledge about different types of markets and the experiences attached to different desert destinations, but there are relatively few examples.

The most immediate demands for information from the stakeholders consulted in this research appear to be in two clear domains. The first is for the purpose of monitoring and management; this requires information about the number and distribution of 4WD travellers across desert Australia. The second is for marketing and product development; this requires more qualitative 'market insights' to help a destination or business define and maximise its competitive advantage. There are important but lesser demands for information about expenditure, economic impacts and for evaluations of various management and marketing strategies.

Spatial representation of information about 4WD tourism in desert Australia, with data attached to locations where trips are taken, is widely expected to be useful. On Track has commenced the development of a GIS specifically for 4WD tourism information. Data has been collated from the data collections described above, Hema Maps and other map sources. Specifications have been developed that would allow the GIS to be used to simulate changes in key data items (such as route selection) over time in response to various scenarios (such as the growth of a particular market, changes to track conditions or overcrowding). The application is called 'Visualising Relatively Unpredictable Movement' (VRUM™). DKCRC, Tourism NT and other partners have committed resources to continue the development of VRUM™ in the 2007/08 and 2008/09 financial years. Development will include simulation models and processes for enhancing data quality and availability.

Market analysis

Market size and trends

The best evidence suggests that close to 40% of all leisure-based self-drive visitors to desert Australia use a 4WD vehicle during at least part of their desert travel. This may be as many as 1.6 million visitors per year and $450 million in annual expenditure. During the period 2000 to 2004, the NTTM reported that international travellers were about 40% of the market, although only a small proportion of all international visitors to Australia (around one percent) travelled to desert regions in a four wheel drive according to the IVS (Carson & Taylor 2008).

The NTTM reports that roughly a third of the interstate visitors to desert Northern Territory are from Victoria and Tasmania collectively, slightly less from New South Wales (30%), close to 15% each from Queensland and South Australia and fewer than 10% were from Western Australia. The IVS shows that most international visitors came from the United Kingdom, Germany, Japan and elsewhere in Europe.

The proportion of desert visitors who were four wheel drive travellers identified in the NTTM remained relatively consistent from 2000–2004 despite declines in international markets to these destinations (by three percent), an increase in air travel (by more than ten percent) at the expense of other road based travel (declining by ten percent) (Carson & Taylor 2008). The composition of the market also remained relatively stable over this period with international travellers around 40%, interstate travellers slightly less than 60% and intra-Territory travellers at less than 2% of the market.

Sales of SUVs, which includes 4WD vehicles, remained strong despite a noticeable slowdown in vehicle sales coming into 2006 (Figure 5). Prior to 2006, sales growth for 4WD vehicles in Australia consistently outstripped general vehicle sales by a magnitude of around 2.5 (Federal Chamber of Automotive Industries 2006). This indicates the potential for continued growth in this market. Meanwhile FWDV estimates there are approximately 40 000 4WD vehicles registered privately in Victoria, of which only around 5% are club members (Powell 2006).

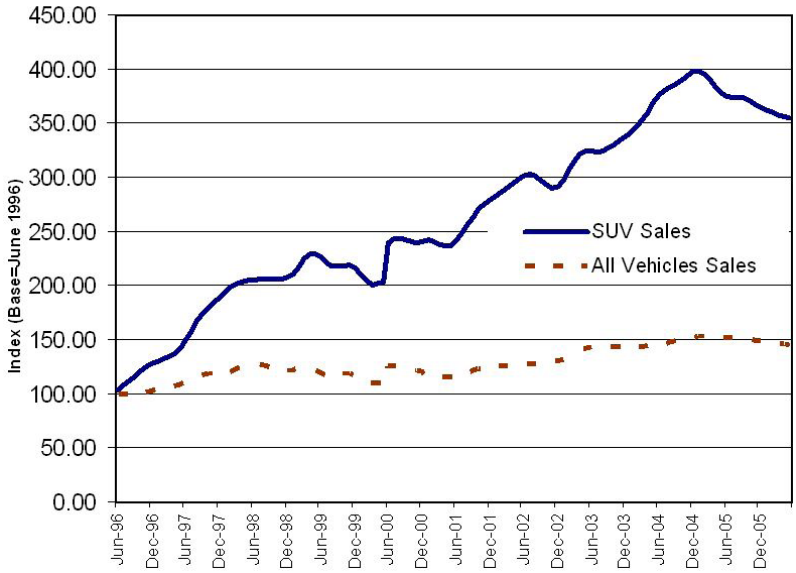


Figure 5: Index of SUV sales

Source: Constructed by the authors using information from the Australian Bureau of Statistics, June 2006.

Market demographics

Travel parties and age

The NTTM reported that half of all four wheel drive leisure travellers to desert areas during 2000 to 2004 did so as couples with no children accompanying them. Family groups made up just over one in ten travel parties while one in five travelled alone. The IVS reported that 33% of international visitors travelled alone, with the next largest proportion travelling as couples.

The age profiles of international and domestic four wheel drive desert leisure travellers were noticeably different. The distribution for the domestic market was relatively mature with 46% aged 55 years or more compared to just eleven percent of international travellers (NTTM, 2000-2004 and IVS, 2003-2005). Contrastingly, just fewer than 70% of international travellers were aged less than 35 years (IVS, 2003-2005). Following this pattern, the next most popular age group for domestic travellers was 45 to 54 years (22.2%) and for international 18 to 24 years (30.2%) (Carson & Taylor 2008).

There are two main demographics reported by club members in the long-form survey. The first is people aged 55–65 who usually travel as couples, and the second is travellers aged 25–35 years. These groups are more likely to travel as a single vehicle party. The older club members are mostly domestic travellers, while international visitors are more frequently in the younger group.

Life cycle effects

The show surveys report that desert enthusiasts are most likely to be living with a spouse or partner and have no children living at home. Many focus group participants are of the view that a life cycle effect is evident in their community: desert trips become more viable financially and time-wise when children have left the home.

While comments from the focus groups and in the literature suggest age is positively related to the affinity for drive holidays, the results from the show surveys indicate there be a cluster of relatively young 4WD enthusiasts who take 4WD trips relatively more frequently. Age correlation of 4WD trip frequencies and lengths shows the median age of those who took more than seven trips in the past three years to be substantially lower (43 years) than those who took seven or less at 50 years. However, the median age for those taking relatively long trips (more than twelve days) was markedly higher (50 years) compared to those who took relatively short trips of twelve days or less at 42 years (Taylor & Prideaux 2008).

Occupation

Occupation data was collected from the long-form survey only. This survey was initially distributed to club members. The results show self-employed people and professionals comprise more than 40% of 4WD club memberships, while retired people only represent 7% of this group.

Vehicle ownership and modifying the vehicle

Around 80% of people interviewed at the National 4X4 Show in Sydney owned a 4WD vehicle. The survey included questions about the reasons for purchasing a 4WD vehicle. Nearly 70% of respondents claim to own a 4WD, at least in part, to drive 'in challenging places off the bitumen by engaging 4WD'. A similar proportion to this say they own it because it provides the means to 'get to places for other activities'. Features such as the vehicle's comfort and room (50%) and safety (52%) were less important, as was the ability to modify it (49%). At the Brisbane and Wandin shows half of all respondents said that modifying their vehicle was 'very important' to them while only 17% said it was 'not important'. Around 20% of respondents said that all of these were important motivations for purchasing a 4WD vehicle.

Environment preferences

The surveys in Brisbane and Wandin asked people about the level of preference for four wheel drive travel in different environments. The 'desert' received the lowest strong preference rating (40% of respondents indicated a strong preference to travel there), and was less preferred than rainforest (58%) or other outback areas (60%). Over 30% stated that they sometimes liked to travel in desert environments, which was similar to rainforest and other outback areas, and more than savannah, beach or alpine environments (Table 7).

Over 25% of all Brisbane and Wandin respondents said they preferred not to travel in desert environments, a rate similar to savannah and beach but more than alpine (20%), rainforest (10%) and other outback areas (8%). The Adelaide survey revealed a median length of trips to desert areas as 16 days with ten of these actually spent in the desert. Just below three-quarters of Adelaide respondents said that they always or sometimes take their holidays in desert areas of Australia (Carson & Taylor 2008).

Table 7: Environment preferences for 4WD trips (%)

	Desert	Savannah	Beach	Alpine	Rainforest	Other outback areas
Strong preference for this environment	41.0	45.3	45.3	54.4	58.3	59.6
Sometimes like to travel in this environment	32.9	27.1	27.1	25.9	31.7	32.0
Prefer not to travel in this environment	26.1	27.6	27.6	19.7	10.0	8.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Taylor and Carson 2006

> *Some environments are more strongly preferred by club members and those with particular living arrangements. Members of 4WD clubs, for example, are more likely to strongly favour alpine (37%) and desert (33%) environments and less likely to strongly favour beach areas (20%). The living arrangements of respondents with children still at home whose preference is for alpine and beach environments.*
>
> (Carson & Taylor 2006)

Trip locations and composition

At the Brisbane and Wandin shows respondents were asked about variations in their favoured sets of locations for trips. More than half (52%) said they always like to try a new trip and a quarter said they have a favourite trip but sometimes try new ones. Only five percent said they always tend to go to the same place for their four wheel drive trips (Carson & Taylor 2008).

The majority of respondents at these two shows (56%) said they always go on trips in a single vehicle or with friends or relatives in multiple vehicles. Very few said they take trips with tour companies (90% said never) and trips organised by 4WD clubs were taken at least sometimes by around 35% of respondents.

Desert trips

Trip motivations

The surveys in Adelaide asked respondents about the main reason they went on a four wheel drive holiday to desert areas. The experience of 'exploring desert areas' was the main motivation for 70% of respondents while the remainder were evenly divided between getting to places for activities and the challenges associated with 4WD driving there (Taylor & Prideaux 2008).

Club members who completed the long-form survey indicated their motivations for desert trips using a Likert scale (with a maximum score of 5). The most important motivations were (paraphrased) getting away from the city (4.72), enjoying the landscape (4.64) and remote places (4.54), the challenge of driving in these places (4.34) and being with like minded people (4.26). Of less importance was testing the car (3.96) and meeting new people (3.95) or locals (3.57). Visiting Aboriginal communities received the lowest median score at 2.89 out of 5.

In-depth interviews with independent travellers while they were travelling in central Australia emphasised the importance of the environment as a motivator. The difference between the remote environment and the home environment or more popular tourist destinations in Australia was regularly cited as a reason for travelling to central Australia:

> *I live in a city and the last thing I want to do is spend a holiday in big cities! I could not spend my holiday at a resort like Surfers' Paradise – that just drives me crazy! The places are just too busy … I've got a very strenuous and demanding job and every now and then I just need to get away from mobile phones and just chill out! (Domestic travel party).*
>
> (Schmallegger & Carson 2007)

Vehicle choice

According to the NTTM, the bulk of domestic travellers who visit desert areas in the Northern Territory did so in privately owned four wheel drive vehicles (68%) whereas international visitors were more likely to be in rental vehicles (40%) or on four wheel drive tours (40%). Less than two percent of domestic 4WD travellers were on four wheel drive tours (Carson & Taylor 2008).

Desert trip frequency and length

The Wandin and Brisbane show surveys indicated that respondents had taken a median of eight 4WD leisure trips during the previous three years, an average of close to three each year. The NTTM indicates that trips by four wheel drive travellers are substantially longer at an average of eighteen nights compared to thirteen nights for other desert visitors. Four wheel drive travellers tend to visit more destinations on their trip (five compared to four). There was some variety in the lengths of stay by four wheel drive travellers, with 19% travelling for less than 7 nights, and 26% travelling for more than 20 nights. There was little difference in the number of desert destinations visited by domestic and international four wheel drive travellers. The NTTM collected information on whether visitors had already or had intended to visit key attractions and sites around the Northern Territory (Carson & Taylor 2008).

Dispersal from main service centres

For desert trips (in the Northern Territory) most itineraries were focused on the iconic attractions of Uluru, Kata Tjuta (the Olgas) and Kings Canyon for both four wheel drive and other travellers. Despite this, a smaller proportion of 4WD travellers (75%) visited Uluru compared to other desert travellers (84%). However, four wheel drive travellers were more likely to disperse to other desert located attractions including to those accessible on bitumen roads. Those of note included the Bungle Bungles in Western Australia (20% compared to 10%), the West MacDonnell Ranges (50% compared to 37%), the East MacDonnell Ranges (24% versus twelve percent), and the Devils Marbles (48% compared to 37%) (Carson & Taylor 2008).

Repeat visits to desert areas

The NTTM found that four wheel drive travellers to desert areas were much more likely to be repeat visitors at 41% compared to 27% for non-four wheel drive desert leisure travellers. Domestic four wheel drive travellers were more likely to be repeat visitors (49%) than were international four wheel drive travellers (29%). The rate of repeat visits was consistent in each year between 2000 and 2004 (Carson & Taylor 2008).

Desert trip planning

Triangulation of data from in-depth interviews in central Australia and the show survey results shows trips tend to be planned well in advance, but planning more usually involves preparing the vehicle and the logistics of provisioning than identifying specific locations to be visited or products that will be consumed. Often travellers select a track (the Tanami Track, Gunbarrel Highway, Canning Stock Route etc.) and identify how to access the track and how to get fuel and food while travelling along the track. They allocate a period of time for the trip, but within that time they prefer their itineraries to be flexible. Few products or activities are booked in advance.

Information sources and bookings

Sources of information for planning 4WD trips were collected at the Wandin and Brisbane shows. Word of mouth (96%) and maps (95%) were the main sources always or sometimes used to plan 4WD trips. Other commonly used sources were visitor information centres (88%), 4WD magazines (86%) and around 80% used the Internet. Membership of 4WD clubs was approximately 30% of interviewees at Brisbane and Wandin.

The IVS identified travel books and guides (55%), the Internet (52%) and friends or relatives (43%) as the most popular sources of information for international travellers planning their 4WD trips in the Australian desert. There were only slight variations between the sources used by 4WD travellers in the desert and other desert travellers, the most significant of which was the wider use of travel guides and books by those travelling in 4WDs (Carson & Taylor 2008).

Word of mouth was also the main source of information used by club members (54%) with commercial maps and the internet also widely used (36%). Around a quarter used club newsletters to source information for planning their desert trips.

The most decisive source of information for independent travellers (interviewed in central Australia) during the trip was word-of-mouth information from other travellers or locals they met on the way. This kind of information had a particularly important influence on the choice of accommodation or additional activities. Decisions about spontaneous side-trips which had not been considered in the pre-trip planning stage were often triggered by informal conversations with other travellers who recommended various sites or activities. Visitor information centres (VICs) were mainly used to obtain more detailed and localised information on arrival at a destination. The primary role of VICs was to obtain brochures and pamphlets and get recommendations about additional places of interest in the area. They were criticised for providing brochures that mainly feature information about commercial tours and catering relatively poorly to the independent market.

It was evident that travellers generally did not seek information about Aboriginal cultural experiences, and when they did, it was not found in the information sources they consulted:

> *We haven't come across anything before at home. But I also have to say that we did not really look for it, so maybe we just missed it. But nobody really recommended it to us and nothing really drew our attention to Aboriginal culture, maybe if we had got some more information before we would have been more aware of it! (International travel party)*

The most commonly encountered information was about organised tours that contained some element of Aboriginal cultural experience. The most commonly encountered information that contained some element of Aboriginal cultural experience was about organised tours. There was a feeling that products were not differentiated from each other and did not offer the level of depth and flexibility (in terms of opening hours and the capacity to negotiate activities with suppliers) that independent travellers sought. Many travellers recommended a more proactive approach to providing information about Aboriginal cultural tourism including having 'sales staff' visit caravan parks or hostels. It was considered important that Aboriginal people get involved in information distribution. Tourists wanted to see and listen to Aboriginal people and wanted to get the impression that Aboriginal people are really interested in sharing their culture with tourists, which they generally did not get from flyers and brochures or from pictures on TV or on the Internet (Schmallegger & Carson 2007).

Activities on desert trips

The NTTM results show that 4WD travellers were more likely to undertake a range of activities when compared to other desert travellers. They were particularly interested in non-commercial activities such as bushwalking (72%), swimming (60%) and photography (30%). At the Adelaide show around a quarter of respondents said they had done a guided Aboriginal tour or an Aboriginal arts or crafts related activity. Only a small percentage of respondents (less than 5%) said they had done any other type of tour. Half had visited a working station, such as cattle or camel stations. The IVS showed that two-thirds of international 4WD travellers to desert Australia visited Aboriginal art or craft and cultural displays and 44% visited an Aboriginal community; these rates are slightly higher than for other desert visitors (57% of international visitors and 40% of domestic visitors, Carson & Taylor 2008).

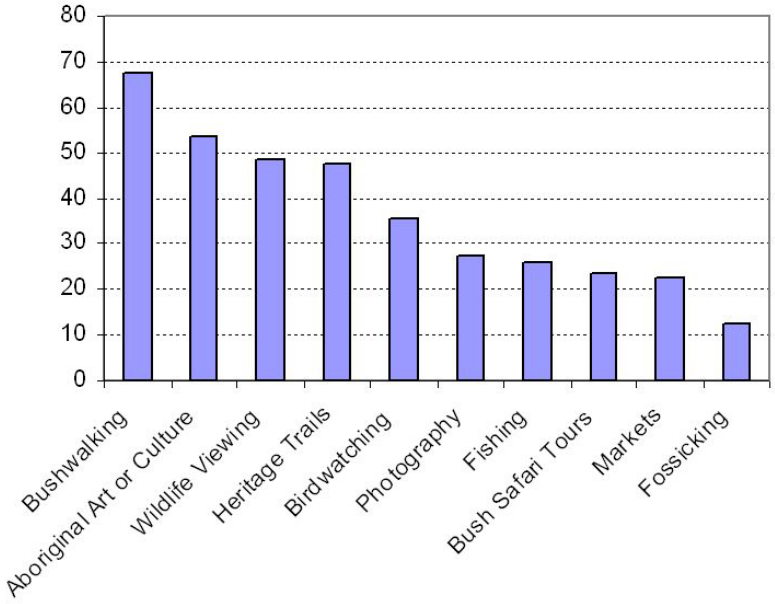


Figure 6: Activities undertaken by 4WD visitors to desert Australia

Desert trip expenditure

A substantial proportion of both 4WD (39%) and other travel parties (43%) said they had a planned budget of more than $9000 for their trip. This figure included transport to the Northern Territory and pre-booked items. Average recorded daily expenditure on all items was 5% lower for 4WD travellers at $368 compared with $384 for other desert travellers. However, average expenditure for the entire trip to the Northern Territory (again, excluding transport to the Northern Territory and pre-booked items) was markedly higher for 4WD travellers at $4370 compared to $3028 for other travellers. More than two-thirds of 4WD and other traveller expenditure was in desert regions.

The 32% higher average total trip expenditure of 4WD travellers reflects their tendency to stay more nights in the Northern Territory and to visit more destinations on their trip. And while both groups spend on average 3 nights in both desert and non-desert locations, four wheel drivers spend more nights in total in the desert at 10 compared to 7 for others (Taylor & Carson 2007).

Four wheel drive desert travellers spend more on transport and food than other travellers, but less on tours and souvenirs. In particular, their level of consumption of Aboriginal tourism products (tours and arts and crafts) is much lower than other desert travellers.

Expenditure was more widely dispersed by 4WD travellers than other travellers. They spent an average of $29 more per day ($380) in destinations other than Alice Springs (the major urban destination in the area covered by this data, where their average daily expenditure was $351). Four wheel drive travellers spent an average of 5 nights in Alice Springs and 13 in surrounding desert areas while other travellers spent 4 nights in Alice Springs and 9 in other areas. Four wheel drivers' additional expenditure in surrounding areas was comprised of accommodation ($37 per day) and transport ($17 per day). While non-4WD travellers spent $58 per night more in destinations outside Alice Springs, this was almost completely accounted for by additional expenditure on accommodation (Taylor & Carson 2007).

Market segments

Triangulation of research results reveals at least three key segments in the current desert 4WD market. The largest segment comprises of people whose main motivation is to explore the desert environment. They take relatively long trips with long segments on 4WD tracks. They use the 4WD vehicle to access parts of the landscape that would not otherwise be accessible. A second segment is more concerned

with undertaking activities or hobbies such as bushwalking, fossicking or bird watching. These visitors use 4WD vehicles to access sites where they undertake those activities. They often minimise the period of time they spend off sealed roads. A third segment is motivated by a desire to test the capacity of their vehicles and their driving skills. They purposely select more difficult tracks and challenging environments. However, they tend to take shorter trips and stay closer to service centres.

In addition to these segments there is a sizable novice market that comprises of travellers who have limited 4WD experience in the desert or any other environment. They often purchase or rent a 4WD vehicle because they perceive that it will be an advantage to have the power or safety it provides and expect that some off road driving will be required during their desert trip.

Research undertaken with these three identified segments and novice travellers reveals some of the values they attach to desert travel. The desert is an iconic landscape for both domestic and international travellers. The landscape is associated with a sense of the authentic or 'real' Australia, away from the urbanised coastal strip. The size of the country, its relative emptiness and a sense of loneliness are powerful attractions to desert travel. Remoteness, distance from emergency services, the cost and availability of fuel and provisions and threats from human and animal inhabitants are deterrents to desert travellers.

Aboriginal tourism

Participants interviewed in central Australia say they generally do not purposively seek out Aboriginal tourism products. Aboriginal cultural activities were mostly limited to non-commercial activities such as visiting art galleries in Alice Springs or the Cultural Centre at Uluru. Only rarely do visits to art galleries encourage travellers to purchase Aboriginal art, and it appeared that many travel parties considered looking at Aboriginal paintings and artefacts as constituting an experience with Aboriginal culture. Some international travel parties participated in free ranger guided tours with non-Aboriginal guides at Uluru (also known as the Mala Walk) which they rated as an Aboriginal cultural experience as well because they received a lot of information about Aboriginal people and the tour took place on Aboriginal land.

Participants generally rated a desire for Aboriginal cultural experiences as a minor contributing factor in decisions about places to visit and activities to undertake. Some travel parties, who were still in the initial stages of their trip, indicated that they would be prepared to participate in Aboriginal cultural activities if they happened to be available when they arrived at a destination. However, such activities were largely considered as potential 'gap fillers' used to complete itineraries and fill in spare time:

We went to one of the gorges near Ross River Resort and we also had a look at the Aboriginal rock art there. But we wouldn't have made the trip out there just because of the Aboriginal art, but in fact we were in the area and had an hour or so to spare. (Domestic travel party)

One of the main complaints from both international and domestic travel groups related to the range and diversity of Aboriginal tourism products. People were repeatedly critical that the only available experiences in the region were focused on Aboriginal art galleries and organised tours from tour operators at the main tourist centres. Such tours were often regarded as not very authentic or interesting and were considered to be mainly targeted towards big tour groups from overseas. Domestic travellers complained about a lack of opportunities to meet Aboriginal people in their settlements and on their traditional land. Many of these people said they were interested in personally guided tours with Aboriginal people to see some remote places and learn something at the same time about Aboriginal traditions. International travellers (self-drive and backpacker) seemed to be rather sceptical about any commercial Aboriginal tourism products, such as organised tours or evening activities. Most international participants generally considered Aboriginal tourism products as not authentic and declared that they did not want to participate in activities that come across as something that is specifically staged for tourists:

It should not turn out to be something like a theatre where everything is just staged and made up from a commercial tour operator! Sometimes you just get the feeling of being ripped off!

(International travel party)

It was apparent from travellers' descriptions of their experiences with Aboriginal cultural tourism that many activities were spontaneously selected and that very little thought had gone into arranging these activities before the trip commenced (Schmallegger & Carson 2007).

Innovation and capacity

Desert Australia's competitiveness as a destination for 4WD tourism is dependent on the viability of the market, the capacity to manage environmental and cultural impacts and the capacity of the tourism industry to continue to offer new products and access new markets. Two case studies were undertaken to assess the capacity of desert Australia to generate these outcomes.

The first study examined the extent and types of collaboration between organisations around the Gunbarrel Highway. The results identified 114 organisations that actively associate themselves with the highway. Only 22% of these (mostly hotels, caravan parks, supermarkets and fuel stations) were physically located on, or adjacent to, the track and are categorised as being in 'close geographic proximity'. The most commonly represented business types (regardless of location) were tourism intermediaries (32%), tour operators (18%) and ancillary businesses (11%) and government administration (11%). However, only a small portion of these have tourism as their core business and they had little direct connection to the track overall. Many of them used a track related word (e.g. Gunbarrel) merely as a search 'hook' with very little direct connection to the region itself. A weak collaboration existed in these cases. However, a small number were specifically connected to the 4WD market with a weak to moderate collaboration.

Most Gunbarrel Highway tours were advertised using brief itineraries that mentioned points of interest along the track. There were some examples of relationships between tour operators and businesses in close geographic proximity. For example, the Tjulyuru Regional Arts Gallery at Warburton and the Warakurna settlement are both occasionally identified by tour operators as a valuable Aboriginal experience. However, most packages highlight the history, the natural beauty of the desert and the 4WD experience to be gained on the trip rather than commercial attractions or products. They demonstrated a weak collaborative connection with the track.

There were no tour operators located in close geographic proximity to the track and only two in desert Australia (at Alice Springs). Others were scattered across all the states in Australia, in regional and metropolitan centres; examples include Guest 4WD in Victoria and Beadell Tours in South Australia.

Only 9% (n=10) of businesses were classified as 'core tourism' and most of them had some other local commercial interests. They were all in close proximity to the track. For example, Carnegie Station provided a camp ground with facilities, fuel and limited supplies for tourists, and at the same time operated as a working cattle station. Roadhouses at Docker River, Warakurna and Warburton service tourist and local needs. These businesses did not have their own web sites but were identified through tour operator sites, the WA government tourism web sites or the council/shire web sites. However, the Tjulyuru Regional Arts Gallery at Warburton did have a strong web presence, which included product information, access details and availability of local services such as accommodation and fuel. Similarly, the more developed towns at the extremities of the Track offered a greater range of services to tourists, including hotels, supermarkets and caravan parks. However, there was little evidence of collaborations being initiated by these organisations; they were rated as weak in terms of collaboration (Cartan & Carson 2009).

A report about visitor patterns and industrial organisation in and around the network of roads which comprise the Red Centre Way in central Australia (Carson & Taylor 2006) examined a number of secondary data sources, drive tourism literature and grey literature to assess the regions' systemic capacity for purposeful change and innovation. It also examined potential barriers to growth and development and assessed the regional potential for tourism based around themed drive touring routes.

The study establishes that the 4WD market is important for desert Australia. While there is limited direct evidence that the 4WD market grew between 2000 and 2006, there is evidence that it did not decline in the way that it has in other key markets. For example, the number of international visitors to the region fell by almost a quarter between 2000 and 2005 despite a doubling in international visitor arrivals to Australia during the 10 years prior to 2005.

There is also no evidence that the rising price of fuel has led to a decline in the 4WD market, although it may have resulted in a lower rate of growth than otherwise would have been experienced. Domestic visitor numbers declined in some areas within the region (by as much as 8% in Alice Springs) and rose for others. However, the regions' share of Northern Territory domestic visitors remained stable between 2000 and 2005.

The length of stay of visitors to the region was estimated to be 4.4 nights in 2005, down from 4.7 nights in the year to September 2004 and 4.6 in the 2003/04 financial year. These declines are mirrored by air passenger statistics which show that inbound passenger numbers to Alice Springs steadily declined in the 10 years to 2005, from around 460 000 per annum to less than 300 000, a reduction of 27% (Bureau of Transport and Regional Economics 2006.). This was during a time when domestic inbound passenger arrivals to Australian airports grew substantially and the relative prices of air tickets were also declining. A re-distribution of air passenger arrivals in the region is evident as arrivals to Uluru airport increased by around 40% in 2004–05.

Road traffic counts for the network of roads servicing the Red Centre Way suggest that traffic along the currently unsealed sections of the Way are used by only a small percentage of the market to connect sites visited in the western parts (particularly Kings Canyon) with sites visited at the eastern end (particularly Palm Valley, Hermannsburg and Glen Helen).

The dominance of the iconic attraction, Uluru, for tourism in the region is clearly indicated by data from the NTTM. More than 80% of visitors to the region spent at least one night there in 2002–2004. And of those who visited Uluru, 95% also included Watarrka National Park on their itinerary. With substantial driving distances between Alice Springs, Uluru and Watarrka and an average length of stay of around four nights in the region, these data suggest there is little diversification in the itineraries of visitors to the region.

The NTTM provides evidence that visitors are increasingly likely to be on organised tours and less likely to be on independent (usually longer) trips. The number of people who visited Uluru, Kings Canyon or Palm Valley with self-drive as their main form of transport has fallen substantially during the past three years. Meanwhile, the proportion of visitors whose main form of transport was 4WD tours has increased. The proportion of visitors to Red Centre Way attractions who undertook four wheel driving as an activity was significantly higher than for visitors to the Northern Territory in general at just under 30% (Carson & Taylor 2006).

As well as trips which invariably feature a visit to Uluru, there is evidence that commercial products, and especially the organised tours sector, is extensively homogeneous. Most tours offer a similar range of 'standard' packages with the promise of similar types of experiences, centred on isolation and 'getting where nobody else gets to'. There is little product innovation to speak of, although individual cases can be found. This contrasts with the risk taking and innovative attributes of systems of innovation where organisations and institutions identify weaknesses in their current ways of doing things and pursue new ideas through research, collaboration and networking.

Business activity is concentrated in a small number of places at the either end of the Way and, in the broader region, is dominated by micro-businesses. With little change in visitor numbers and the composition of the business sector, product development is dependent on public sector investment and engagement with traditional landowners. The generation of new economic activities and diversification away from the existing spatial and sectoral concentrations, is restrained by the absence of a core of dynamic businesses and institutions actively seeking ideas and pathways for economic diversification. Attributes that one could expect to find on a successful touring route in relation to visitor behaviour, stakeholder collaboration and networking are lacking in the central Australian region.

Responsible travel

Encouraging responsible 4WD travel in desert Australia is consistently prioritised as an objective by all groups of stakeholders consulted during the On Track research. Key concerns include traveller safety, damage to the environment, attention to cultural sensitivities, preparedness for desert travel conditions, compliance with regulations and legislation governing desert travel, straying from permitted travel areas (including causing property damage) and causing a nuisance to fellow travellers. Evidence for irresponsible travel may be found in traffic incidents and reports, emergency services logs, reports of property damage, reports of damage at camping sites and attractions and records of travel parties without the required permits. Irresponsible travel not only creates management costs (for the provision of emergency services, cleaning up environmental damage, repairing fences etc.) but in a general distrust of 4WD travellers by local communities and land managers.

Results from the long form survey of club members provides some insights into how this group of the 4WD community perceive some facets of the issue of responsible travel. When asked about the things that would most improve their 4WD experiences, respondents ranked ‘greater access to areas/routes within Australia’ as the most important with a mean rank of 1.99 (with a lower rank meaning greater importance is attached to the item). Other key issues for respondents were (paraphrased) improved education for less experienced drivers (2.68), more responsible advertisements about the capabilities of 4WD vehicles (2.69) and better information about permit requirements and systems for obtaining them (2.97). Improved information about local attractions was seen as least likely to improve their trip experience (3.04).

Issues related to sustainability and safety featured in club member’s assessments of the relative importance of a variety of statements in relation to the industry and 4WD tourism. More than 90% strongly agreed, for example, that sustainable driving practices were important to the preservation of the environment and that advertisements for 4WD vehicles help create unrealistic and unsafe expectations (79%). More than half said they had often stopped and assisted 4WD travellers in rental vehicles.

Results from the Adelaide show survey indicate that almost 60% of desert 4WD travellers had previously done a (4WD specific) safety training or driver training course. Close to 80% at the same show said they obtained travel safety information before going on their last 4WD trip to a desert area. Nearly two-thirds of people interviewed at the Sydney show felt they were very experienced or had a reasonable level of experience in four wheel driving off the bitumen (Carson & Taylor 2008).

Just under two-thirds of show survey respondents at Brisbane and Wandin said they always prepare an emergency contingency plan prior to embarking on a 4WD trip. More than 80% said they always acquire the necessary permits for accessing land during their trips.

A literature review of existing secondary data, the internet, grey literature and state and territory policy documents about responsible travel identified around 40 web sites that provide information about safe travel and permits. Many of these are government sites including park management agencies and transport departments.

Conflicting opinions, and indeed conflicting data, has emerged about the relative safety of 4WD vehicles, their drivers and their contributions to fatal and other traffic incidents. James (2004) claims that 4WD vehicles reduce the risks for their occupants but raise the risks faced by everyone else using the roads. While some sources suggest an exponential increase (by 85%) in fatal 4WD crashes occurred in the 10 years to 1998 (Hon Ron Boswell 2002), it was also found the number of kilometres travelled by 4WD vehicles increased by 88% (from 8608 million to 16 209 million kilometres) between 1995 and 1998 (ATSB 2002).

Tay (2002) reported on a survey of 50 accidents where a 4WD vehicle impacted a passenger vehicle in the side. They reported no deaths of the 94 occupants in 4WD vehicles compared with 66 deaths of the 110 car occupants. The insurer, AAMI, and the Pedestrian Council of Australia claim that 4WD vehicles involved in multiple car crashes resulted in a 64% fatality rate to passenger vehicle occupants compared with only 18% of 4WD vehicle occupants (AAMI 2004).

The PCA claims that, for every 1000 crashes involving a 4WD vehicle, 32 drivers of passenger vehicles were killed or hospitalised whereas in crashes involving medium-size cars only 21 drivers of the other vehicle were killed or hospitalised. This example, they argue, demonstrates that if you have an accident in a 4WD vehicle instead of a medium size car, the chances of killing or hospitalizing the other driver increase by 11 per 1000 fatal crashes. However, the Royal Automobile Club of Victoria (2006) found that the increasing number of 4WD vehicles on NSW roads do not appear to be associated with an increase in the number of car drivers being killed in multi-vehicle crashes.

According to the Australian Transport Safety Bureau (ATSB) the proportion of 4WD crashes involving pedestrians (11%) was almost half the proportion of passenger car crashes involving pedestrians (20%) (ABS 2002). A report compiled by the Motor Accidents Authority (NSW) for the NSW Legislative Council Standing Committee on Law and Justice, investigating compulsory third party insurance claims against 4WD vehicles found that the number and cost of claims against 4WD vehicles was lower than their shared vehicle risk (i.e. 4WD owners had a lower number of claims and the size of claims was lower compared with other vehicle types). The report showed that the cost of pedestrian claims represented 15% of the cost to other vehicles compared with only 8% of 4WD vehicle costs (Legislative Council Standing Committee on Law and Justice, n.d.).

Rollovers are the single biggest cause of fatal 4WD accidents. The RACV found that 4WD drivers were 3.4 times more likely to die in a rollover compared with other road users. James (2004) found that the roof of a 4WD vehicle was more likely to crush in a rollover than the roof of a normal passenger vehicle and that a higher proportion of 4WD vehicles (35%) were involved in fatal rollover crashes compared with normal passenger vehicles (13%). Ananthaswamy (2003) claims that 35.2% of all fatal SUV crashes involve rollovers. The proportion of 4WD vehicles that rolled over without previous collision was more than 3 times the proportion of passenger vehicles (Australian Academy of Science 2003).

Despite these findings, data from a study by Newstead and Watson et al. (2006) indicates 4WD vehicles have a better than average 'crashworthiness' rating (2.92 people being killed or hospitalized per 100 crashes), compared with the average crashworthiness for all vehicles (3.78). Large and medium-sized 4WD vehicle's crashworthiness is better than large cars (3.43), medium cars (3.86) and small cars (4.27).

The environmental impacts of 4WD travel are an area of ongoing concern for stakeholders and travellers themselves. Several studies of the environmental footprint of off-road four wheel driving were identified by a review of formal and grey literature on the topic. Buckley and Pannell (1990), for example, list some of the impacts of 'free-wheeling' tourists:

- track creation and widening
- road kills
- increased risk of fire from cigarette butts being thrown from vehicles and from exhaust sparks

- vandalism
- spread of weeds
- exhaust fumes
- noise pollution
- turbid run-off.

Some of the literature suggests that the impacts on desert environments are significant. According to Liddle (1997) and Brainard (1998), the recovery of crusted soil surfaces caused by a single passage of a 4WD vehicle in the desert is estimated to take 680 years or more. The Standing Committee on Environment and Conservation (1977) reported that vegetation in desert areas is very fragile and off-road vehicle activity in these parts is considered very destructive due to the erosion caused by wheel tracks, the changes to water flow caused by erosion and dust which smothers and kills flora.

Many species of fauna in the desert live in burrows and feed or rest on, or near, the ground. They are vulnerable to being crushed or disturbed by passing 4WD vehicles that bring noise and vibrations to their habitats (Standing Committee on Environment and Conservation 1977). According to a report in the Bulletin by Hoy (2005), some, perhaps many, 4WD operators in the Simpson Desert refuse to stay on the existing tracks and instead drive on fragile salt lakes, across sand country and over previously pristine desert flora. They claim that drivers ignore recommended speed and tyre pressures designed to protect the dunes and some drivers have been seen 'attacking' Big Red (considered to be the largest sand dune in the Simpson Desert) up to six times or more just for fun. Ruth Doyle claims that this practice has resulted in Big Red shifting three metres in a single year. According to Weaver and Dale (1978), Godfrey and Godfrey (1980), Onyeanusi (1986), Woodward (1995) and Buckley (2001) off-road vehicles cause more damage to vegetation on slopes than on level ground and when turning rather than travelling in a straight line. This makes education particularly important because skilled drivers can reduce their impact on the desert environment by knowing how to negotiate the desert with minimal environmental damage.

Off-road vehicles can spread noxious weeds into pristine environments, destabilising the balance of the natural environment (Standing Committee on Environment and Conservation 1977). Off-road vehicles spread weeds by carrying seeds in radiator grilles and in mud on tyres, in guards or on the under-body of the vehicle (Wace 1977, Marion et al. 1986). For example, in Kakadu National Park Lonsdale and Lane (1994) found 1505 individual seeds of 84 different plant species on 384 parked cars. Priskin (2003b) argues that increased visitor numbers to Kakadu National Park are positively correlated with increased weed infestations. Four-wheel drive vehicles, she claims, have been identified as important vectors of introduced species in Kakadu National Park. The dieback fungi (Phytophthora cinnamoni) a plant pathogen in Jarrah trees is a risk to biodiversity in south Western Australia and recreational 4WD vehicles are known to be vectors of the disease in this area (Newell & Wilson 1993, Gillen & Napier 1994, Baker & Wardlow 1995, Hill et al. 1995, Shearer & Dillon 1996).

These results highlight the fact that there is not a clear picture of the extent of the problems that result from irresponsible behaviour by 4WD visitors to desert Australia. Statistical indicators are maintained by many different agencies and they are not consolidated, even within a single jurisdiction, let alone across the desert as a whole. It is also likely that many incidents of concern do not get reported through formal channels: fellow travellers providing fuel or water or towing stranded vehicles to safety, for example. Even when records are kept, the administering agencies do not appear to have conducted much analysis. Consequently, anecdotes, prominent reports in the popular press, and what is likely to be a relatively small number of 'high impact' incidents, may have greatest impact on public perceptions.

8. Conclusion

On Track has collected a wide range of information about 4WD tourism and the potential value of this market to desert Australia. Very little knowledge about this market had been codified previously. It is difficult to summarise the key findings of the research so far. Limitations in the scope and coverage of data demands that conclusions be drawn cautiously. There are many potential end users of this information, although few are able to clearly articulate their needs for information. It is likely that these end users will find information more useable if its delivery is via a process of dialogue than via any number of formal reports delivered at a distance. Some general observations can be made about the 4WD market in desert Australia that may stimulate thinking into the issues of increasing economic value, improving environmental, social and cultural management, enhancing traveller safety and improving marketing and product distribution.

The market is potentially more diverse than has been recognised. The development of 4WD tourism has been focused on the major desert tracks and the relatively long trips taken by (primarily domestic) travellers wanting to conquer those tracks. Other markets have received less attention. Other markets include travellers looking to indulge in a special interest (such as bushwalking, bird-watching, fossicking or art), travellers wanting to test their driving skills and vehicle capabilities in a range of settings and novice 4WD travellers who want relatively short, supervised experiences as part of their overall holiday. This latter group is likely to include a substantial number of international tourists, as well as travellers who coincidentally have a 4WD vehicle (caravanners, for example) but have limited off road experience.

The value of desert travel needs to be emphasised to current and potential visitors. Barriers to desert travel include perceptions that it is expensive and that there is a lack of the fundamental goods and services available. This may mean that many travellers choose alternative (non-desert) experiences. Those who do come, however, purchase many staple items (including food, fuel, vehicle maintenance services and supplies) outside major population centres, providing income to remote settlements that may have few alternative sources of income. There is an opportunity to increase the range of products and services offered to 4WD travellers in these places. Increased collaboration between desert businesses may help identify and deliver these products. These existing barriers can be overcome, in part, by promoting perceptions of the worth of desert travel.

Desert 4WD travellers spend little time searching for activities (particularly commercial ones) through the standard product distribution channels. The sources and style of information used by 4WD travellers to plan their trips appears to be disconnected from the promotional strategies used by desert tourism businesses. Four wheel drive travellers often have well established communication networks through clubs, motoring associations, online communities, maps and personal networks. They are interested in a range of activities that help them learn about the desert and fill in time, but they are wary of planning these activities in advance. The current focus on marketing organised tours and the encouragement of pre-booking desert travel has contributed to a perception that these products (including Aboriginal cultural tourism experiences) are not suited to 4WD travellers. Urgent attention must be paid to improving the packaging and promotion of products, particularly for more independent 4WD markets.

Managing traveller behaviour in relation to safety, environmental and cultural respect is a priority for desert people. There is little evidence that 4WD travel has a substantial impact on desert environments or that the behaviour of 4WD travellers presents systematic problems for land managers and desert settlements. However, even a small number of prominent incidents can create a perception among Aboriginal communities, parks agencies, pastoralists and other stakeholders that 4WD tourism leads to costs that exceed its benefits. A great deal of investment has been made in educational material for travellers, but neither the producers of this material, nor its intended audience, are confident that the

message is being received and acted upon to the extent that they desire. The emergence of increasingly sophisticated information and communication technologies, and key 4WD markets embracing of them, may offer an opportunity to develop better information and education programs.

An expanded range of products and services packaged as preferred by 4WD travellers and an increased awareness of the products and services that are available in desert areas may provide 4WD visitors with a greater incentive to spend their money in the desert. Products and services should be available when the traveller wants them, rather than on rigid schedules that are more appropriate for the organised tour market. Products and services should allow access to more of the natural environment, provide education about the significance of that environment (particularly for people travelling with their families) and be able to be consumed by small groups.

Protection of cultural, social and natural values from the impacts of 4WD tourism will be enhanced by more effective systems for managing access to land and by providing education about environmental, cultural and social practices. Increasing the regulation of travel behaviour is unlikely to be effective because regulations are difficult to enforce. On the other hand, providing information about the environmental, cultural and social values of desert landscapes may enhance many people's travel experiences.

Better driver education may lead to safer and more appropriate driving practices. The provision of this education can also provide income. Existing desert businesses already provide these products, particularly to novice travellers. Hire car companies are critical stakeholders of this education process. The use of in-vehicle technologies may allow the distribution of information about weather and road conditions as well as improving communication between travellers and emergency services.

It is often difficult for tourism businesses and destination marketing organisations to make decisions about when they should be competing with each other and when there might be opportunities for collaboration. Collaboration appears more likely to be an effective strategy, at least in the short term, while the market and the product base are being developed. There is an opportunity to convert existing demand for long-haul 4WD travel in non-desert environments (such as rainforest and alpine environments) into desert trips if the desert can present itself as a series of destinations that offer worthwhile experiences. Four wheel drive travellers are motivated by a desire to regularly move to new places and they actively seek structures (tracks, for example) which facilitate this. They source information about future destinations as they travel and the quality of the assistance provided when seeking information plays a role in shaping their satisfaction with the destination in which the information is obtained. For this reason it is as important to promote the features of future destinations as it is to promote the current destination. It is likely, however, that the desert has a number of sets of linked destinations that may change according to the market (international versus domestic or self-drive versus fly-drive for example) or the seasons. Sets may also include non-desert destinations. It is essential to understand trip patterns in order to inform businesses and destinations about the collaborations that may be most valuable to them.

End users will benefit from 4WD tourism in desert Australia if they can maximise their contribution to the tourism system. Aboriginal settlements play an important role in determining access to land and in providing basic fuel, food and accommodation services in many locations. It could be argued that current management practices aim to deny access, while benefits may be delivered by a regime that facilitates access and provides economic returns to land managers. While food, fuel and accommodation are the core products, some segments of the market may be interested in tours, souvenirs and educational material. As new businesses enter the marketplace it will become necessary to provide different types of accommodation and to target specific types of 4WD travellers.

The organised (and tag-along) tour sector may be at the forefront of the introduction of new products and services to the market. They form relationships with land managers to gain access to new tracks and sites and can use these relationships and their delivery of different products and activities as a point of difference for their customers. Consumer groups and automobile associations also organise many desert 4WD trips and could be engaged to deliver products and implement education and management strategies. Tour operators, roadhouses and stores are likely to be the kind of businesses at the heart of successful collaborations because they are the 'touch points' for consumers from different markets. Car hire firms, visitor information centres and map and guide book distributors also serve as touch points, and their role is one of information provision (including education).

Local, regional and state tourism organisations must not limit themselves to the provision of promotional material (much of which is also provided by commercial and consumer driven interests that have greater credibility among key markets). They can serve a more fundamental role coordinating industrial collaborations that lead to the development of new products and experiences and target specific markets.

Research can continue to contribute to the sustainable growth of a desert 4WD tourism market. There is an urgent need to establish data collection systems which provide better market insights and allow monitoring of the marketplace over time. Data should not just come from travellers, but from the businesses that serve them and from the management agencies with an interest in this form of desert travel. Better data will help increase the recognition of the value of this market and help establish the most effective marketing and management strategies. Better data will facilitate business planning that considers the segments within the market and promote the diversification of products and experiences. The On Track project will contribute by developing the VRUM™ GIS which will show the distribution of visitors across desert Australia, identify the distribution of specific market segments and model the impacts of various events on these distributions. On Track will also contribute to research into improved communication with desert 4WD travellers. The project will research technologies that could facilitate two-way in-trip communication with a view to addressing existing product distribution and visitor management issues.

References

Aaker D and Joachimsthaler E. 2000. *Brand Leadership: Building assets in an information economy*. The Free Press, New York.

AAMI. 2004. *AAMI Crash Index: Tenth annual road safety report – October 2004*.Available from http://www.aami.com.au/Resources/File.aspx?id=4.

Ananthaswamy A. 2003. Crunch time for the SUV, *New Scientist*, vol. 177, no. 2385, p. 12.

ATSB (Australian Transport Safety Bureau). 2002. *Four Wheel Drive Crashes*. Australian Transport Safety Bureau, Canberra.

Australian Academy of Science. 2003. Bogged down in the four-wheel drive debate?, *Nova*, [Online] Available at: http://www.science.org.au/nova/080/080print.htm

Australian Bureau of Statistics. 2006. *Sales of new motor vehicles (June quarter)*, Australian Government Printing Service, Canberra.

Australian Transport Safety Bureau. 2002. *Monograph 11: four wheel drive crashes*, Available at: http://www.atsb.gov.au

Baker P and Wardlaw T. 1995. Susceptibility of selected Tasmanian rare plants to *Phytophthora cinnamomi*, *Australian Journal of Botany*, vol. 43, pp. 379–386.

Bala V and Goyal S. 1994. The birth of a new market, *The Economic Journal*, vol. 104 (March). pp. 282–290.

Basham J. 2005. *Gregory's 4WD survival guide: driving skills, troubleshooting and vehicle maintenance*, Universal Publishers, Sydney.

Boswell R (Parliamentary Secretary to the Minister for Transport and Regional Services). 2002. *Large increases in fatal four wheel drive crashes*, media release, Parliament House, Canberra, 14 March.

Brainard J. 1998. Patton tank marks suggest long recovery, *Science News*, vol. 154, p. 87.

Buckley R and Pannell J. 1990. Environmental impacts of tourism and recreation in national parks and conservation reserves, *Journal Tourism Studies*, vol. 1, no. 1, pp. 24–32.

Buckley R. 2001. *Green guide for 4WD tours: best-practice environmental management for 4WD and off-road tours*, CRC for Sustainable Tourism, Griffith University, Gold Coast.

Buhalis D. 2000. Marketing the competitive destination of the future, *Tourism Management*, vol.21, no. 1, pp. 97–116.

Bureau of Transport and Regional Economics. 2006. *Aviation*, Available at: http://www.btre.gov.au/info.aspx?NodeId=49

Carson D and Jacobsen D. 2005. Knowledge matters: harnessing innovation for regional tourism development. In *Regional tourism cases: innovation in regional tourism*, Eds. D Carson and J Macbeth, *Common Ground*, Melbourne, pp. 17–27.

Carson D and Macbeth J. 2005. Regional tourism systems and the implications of innovative behaviour. In *Regional tourism cases: innovation in regional tourism*, Eds. D Carson and J Macbeth, *Common Ground*, Melbourne, pp. 125–129.

Carson D and Taylor A. 2006. *The charge of the 'might' brigade – challenges for a sustainable four wheel drive tourism industry*, Desert Knowledge Symposium and Business Showcase, Alice Springs, Northern Territory.

Carson D and Taylor A. 2008. Sustaining four wheel drive tourism in desert Australia: exploring the evidence from a demand perspective, *The Rangeland Journal*, vol. 30, no. 1, pp. 77–83.

Cartan G and Carson D. 2009. Local engagement in economic development and industrial collaboration around Australia's Gunbarrel Highway, *Tourism Geographies*, 11(2) 169–186.

Churchill GA and Iacobucci D. 2005. *Marketing Research: Methodological Foundations*. (International student edition). Thomson Learning, Mason, Ohio.

Crouch G and Ritchie J. 1999. Tourism, competitiveness, and societal prosperity, *Journal of Business Research*, vol. 44, pp. 137–52.

Derrett R. 2002. Drive tourism and special interest tourism, in *Drive tourism: up the wall and round the bend*, Eds. D Carson, I Waller and N Scott, Cooperative Research Centre for Sustainable Tourism, Gold Coast, pp.11–24.

Desert Knowledge Australia. 2005. *Our outback: partnerships and pathways to success in tourism*, Desert Knowledge Australia, Alice Springs

DKCRC. 2006. *Desert 4WD Tourism gets On Track with world first research project*, Media release 8 February. DKCRC, Alice Springs. Available from http://www.desertknowledgecrc.com.au/news/downloads/Desert%204WD%20Tourism%20gets%20On%20Track%20with%20world%20first%20research%20project.pdf.

DKCRC. 2007. Map: Arid and semi arid zones. *Desert Knowledge CRC Data Project - Resource material on desert Australia*. Available from http://www.desertknowledgecrc.com.au/desert_information/desertmaps.html

DKCRC. 2008. *Desert Knowledge CRC Home*. Available from: http://www.desertknowledgecrc.com.au/

Diaz-Martin A, Iglesias V, Vazquez R and Ruiz A. 2000. The use of quality expectations to segment a service market, *The Journal of Services Marketing*, vol.14, pp.132–146.

Dredge D and Jenkins J. 2003. Destination place identity and regional tourism policy, *Tourism Geographies*, vol. 5, no. 4, pp. 383–407.

Enright M and Newton J. 2005. Determinants of tourism destination competitiveness in Asia Pacific: comprehensiveness and universality, *Journal of Travel Research*, vol. 43, no. 4, pp. 339–350.

ExplorOz. 2007. *Canning Stock Route*, Available at: http://www.exploroz.com/TrekNotes/WDeserts/Canning_Stock_Route.asp

Federal Chamber of Automotive Industries. 2006. *VFACTS*, Available at: http://www.fcai.com.au/sales

Gard R and Gard E. 1995. *Canning Stock Route: a traveller's guide*, 2nd edn, Western Desert Guides, Wembley Downs.

Geosciences Australia. 2006. *Deserts of Australia*, Available at: http://www.ga.gov.au/education/geoscience-basics/landforms/deserts.jsp

Gillen K and Napier A. 1994. Management of access, *Journal of the Royal Society of Western Australia*, vol. 77, pp. 163–168.

Godfrey P and Godfrey M. 1980. Ecological effects of off-road vehicles on Cape Cod, *Oceanus*, vol. 23, no. 4, pp. 56–67.

Hall L. 2006. The zest for adventure in Australian overland narratives, 1920–2000, *Journal of Tourism and Cultural Change*, vol. 4, no. 2, pp. 85–95.

Hardy A. 2003. An investigation into the key factors necessary for the development of iconic touring routes, *Journal of Vacation Marketing*, vol. 9, no. 4, pp. 314–330.

Haslam McKenzie F. 2007. *Attracting and retaining skilled and professional staff in remote locations*, DKCRC Report 21, Desert Knowledge Cooperative Research Centre, Alice Springs.

Hassan S. 2000. Determinants of market competitiveness in an environmentally sustainable tourism industry, *Journal of Travel Research*, vol. 38, no. 3, pp. 239–245.

Hema Maps. 2001. *Australia's great desert tracks companion guide*, Hema Maps, Australia.

Hercock M. 1999. The impacts of recreation and tourism in the remote North Kimberly region of Western Australia, *The Environmentalist*, vol. 19, no. 3, pp. 259–275.

Hill T, Tippett J and Shearer B. 1995. Evaluation of three treatments for eradication of Phytophthora cinnamomi from deep, leached sands in southwest Australia, *Plant Disease*, vol. 79, pp. 122–127.

Hoepfl MC. 1997. Choosing qualitative research: A primer for technology education researchers. *Journal of Technology Education*. 9(1). 47–63.

Hoy A. 2005. Desert rats: a rampaging 4WD army is ripping through the red heart, prompting calls for a ban to save the pristine wilderness, *The Bulletin*, vol. 123, no. 34.

Huybers T. 2003. Domestic tourism destination choices: a choice modelling analysis, *International Journal of Tourism Research*, vol. 5, no. 6, pp. 445–459.

James M. 2004. *Road Safety and 4WD vehicles, Research Note no. 27 2003–04*, Science, Technology, Environment and Resource Group, Parliamentary Library, Canberra.

Jennings G. 2001. *Tourism Research*, John Wiley and Sons, Milton.

Jennings G. 2007. *Water based tourism, sport and leisure recreation experiences*. Butterworth-Heinemann, Oxford.

Klenosky D. 2002. The 'pull' of tourism destinations: a means-end investigation, *Journal of Travel Research*, vol. 40, no. 4, pp. 385–395.

Knoben J and Oerlemans L. 2006. Proximity and inter-organisational collaboration: a literature review, *International Journal of Management Reviews*, 8(2), pp. 71–89.

Kozak M and Rimmington M. 1999. Measuring tourist destination competitiveness: conceptual considerations and empirical findings, *International Journal of Hospitality Management*, vol. 18, no. 3, pp. 273–283.

Krueger R. 2000. *Focus groups: a practical guide for applied research*, Sage Publications, Thousand Oaks, CA.

Laws E and Scott N. 2003. Developing new tourism services: dinosaurs, a new drive tourism resource for remote regions?, *Journal of Vacation Marketing*, vol. 9, no. 4, pp. 368–380.

Legislative Council Standing Committee on Law and Justice. n.d. *Review of CTP claims: experience of 4WD vehicles*, Motor Accidents Authority, Sydney.

Liddle M. 1997. *Recreation ecology*, Chapman and Hall, London.

Lonsdale W and Lane A. 1994. Vehicles as vectors of weed seeds in Kakadu National Park in plant invasions, *Kowari*, vol. 2, pp. 167–169.

Macbeth J, Carson D and Northcote J. 2005. Social capital, tourism and regional development: SPCC as a basis for innovation and sustainability, *Current Issues in Tourism,* vol. 7, no. 6, pp. 502–522.

Marion J, Cole D and Bratton S. 1986. *Exotic vegetation in wilderness areas*, General Technical Report INT-212, US Forestry Service.

McKercher B and Robbins B. 1998. Business development issues affecting nature-based tourism operators in Australia, *Journal of Sustainable Tourism*, vol. 6, no. 2, pp.173–188.

Newell G and Wilson B. 1993. The relationship between cinnamon fungus (Phytophthora cinnamomi) and the abundance of Antechinus stuartii (Dasyuridae Marsupialia) in the Brisbane Ranges, Victoria, *Wildlife Research*, vol. 20, pp. 251–259.

Newstead S, Watson L and Cameron M. 2006. *Vehicle safety ratings estimated from police reported crash data, 2006 update*, Monash University Accident Research Centre, Melbourne.

Northcote J and Macbeth J. 2006. Conceptualizing yield: sustainable tourism management, *Annals of Tourism Research*, vol. 33, no. 1, pp. 199–220.

Northern Territory Tourism Commission. 2004. *Northern Territory Travel Monitor*, Northern Territory Tourism Commission, Darwin.

Olsen M. 2002. Keeping track of the self-drive market. In *Drive tourism: up the wall and around the bend*. Eds. D Carson, I Waller and N Scott, Common Ground, Melbourne, pp. 11–24.

Olsen M. 2003. Tourism themed routes: a Queensland perspective, *Journal of Vacation Marketing*, vol. 9, no. 4, pp. 331–341.

Onyeanusi A. 1986. Measurements of impact of tourist off-road driving on grasslands in Masai Mara National Reserve, Kenya: a simulation approach, *Environmental Conservation*, vol. 13, pp. 325–329.

Powell Z. 2006. [Internal datasets], Four Wheel Drive Victoria, Melbourne.

Priskin J. 2003a. Physical impacts of four wheel drive tourism and recreation in a semi-arid, natural environment, *Ocean and Coastal Management*, vol. 46, no. 1, pp. 127–155.

Priskin J. 2003b. Tourist perceptions of degradation caused by coastal nature-based recreation, *Environmental Management*, vol. 32, no. 2, pp.189–204.

Ritchie J and Lewis J. 2003. *Qualitative Research Practice: A guide for social science students and researchers*. Sage Publications, London.

Rollins W. 2006. Reflections on a spare tyre: SUVs and postmodern environmental consciousness. *Environmental History*. 11(4). 684–723.

Royal Automobile Club of Victoria. 2006. *Four wheel drive vehicles crash involvement patterns*, RACV, Noble Park.

Rosa J, Porac J, Runser-Spanjol J and Saxon M. 1999. Sociocognitive dynamics in a product market, *Journal of Vacation Marketing*, vol. 63 (Special issue), pp. 64–77

Schmallegger D and Carson D. 2007. Reaching the independent traveller: product distribution issues for Aboriginal tourism enterprises in remote Australia, *Perspectives in Tourism*, 3rd International Conference on Tourism, Athens, 5–6 July 2007.

Scott N. 2002. Product market perspective of self-drive tourism. In *Drive tourism: up the wall and around the bend*. Eds. D Carson, I Waller and N Scott, Common Ground, Melbourne, pp. 81–90.

Shearer B and Dillon M. 1996. Impact and disease centre characteristics of *Phytophthora cinnamomi* infestations of Banksia woodlands on the Swan Coastal Plain, Western Australia, *Australian Journal of Botany*, vol. 44, pp. 79–90.

Standing Committee on Environment and Conservation. 1977. *Off-road vehicles: impact on the Australian environment*, AGPS, Canberra.

Tay RS. 2002. The prisoner's dilemma and vehicle safety: some policy implications. *Journal of Transport Economics and Policy*. 36(3). 491–495.

Taylor A. 2005. 'A critical evaluation of aspects of the tourism information commodity marketplace in Australia and some implications for innovation in tourism'. M. Bus. Dissertation, School of Tourism and Hospitality, Southern Cross University, Lismore.

Taylor A. 2006. *On track four wheel drive club member focus groups – results overview*, DKCRC, Alice Springs. Available from http://www.desertknowledgecrc.com.au/research/downloads/focusgroupreport.pdf.

Taylor A and Carson D. 2007. It's all good: implications of environment choice by domestic 4WD travellers in Australia, in *Proceedings of the 17th annual Council for Australian University Tourism and Hospitality Education Conference*, Eds. I McDonnell, S Grabowski and R March, Sydney, Australia, 11–14, February 2007.

Taylor A and Prideaux B. 2008. Profiling four wheel drive tourism markets for desert Australia, *Journal of Vacation Marketing*. 14(1) 71–86.

Tremblay P. 2006. *Desert Tourism Scoping Study*, A report by Charles Darwin University, in conjuction with Curtin University, DKCRC Research Report 12, Desert Knowledge CRC, Alice Springs.

Triandis HC. 1972. *The Analysis of Subjective Culture*. John Wiley, New York.

Veal AJ. 2006. *Research Methods for Leisure and Tourism: A practical guide*. Edn 6. Pearson Education, Harlow, England.

Wace N. 1977. Assessment of dispersal of plant species – the car-borne flora in Canberra, *Proceedings of the Ecological Society of Australia*, vol. 10, pp. 115–129.

Ware C and Budge S. 2002. The great green way. In *Drive tourism: up the wall and around the bend*. Eds. D Carson, I Waller and N Scott, Common Ground, Melbourne, pp. 25–32.

Weaver T and Dale D. 1978. Trampling effects of hikers, motorcycles and horses in meadows and forests, *Journal of Applied Ecology*, vol. 15, pp. 451–457.

Woodward B. 1995. Drive to get bush bashers back on track, *GEO*, vol. 17, pp. 1321–6554.

Appendix A – Detailed research methods used in On Track

Introduction

This attachment provides technical documentation of the research methods used in Stage 1 of On Track. Its aim is to serve as a record of the research and to assist future research in this or a related field. The documentation of methodology in this attachment is presented by reference to the four research themes of the project and Table 8 below summarises each of these.

Table 8: Summary of On Track research methods

Theme	Method
Information management	Collation and analysis of secondary data sources Trip patterns survey (4WD travellers in the desert) Spatial analysis of trip itineraries Route selection modelling
Market analysis	Analysis of secondary data sources Focus groups (4WD owners) Market segmentation survey instrument (4WD owners) Long form survey instrument (4WD owners) International hire car travellers survey In-depth interviews (4WD travellers in the desert) In-depth interviews (experienced 4WD travellers) 'Tales from the Track' story competition (4WD travellers) Analysis of travel blogs, club newsletters etc.
Innovation and capacity	Interviews with tourism operators and managers Review of policy documents and grey literature Analysis of secondary data sources
Responsible travel	Analysis of secondary data sources Long form survey instrument (4WD owners) International hire car travellers survey Review of policy documents and grey literature Analysis of travel blogs, club newsletters etc.

Engagement and consultation with the key stakeholders of desert tourism, the 4WD industry and desert environment land managers or responsible agencies is a key element of this project. The diagram below demonstrates the relationship between the research, the initial engagement with stakeholders and industry representatives and ongoing engagement with these groups. This process includes a major round of meetings and consultations held during the early stages of the project to gather the information available. In tandem with stakeholder consultations, a systematic trawl of internet-based research and other available information on the topic was undertaken. Results were fed into the literature review and contributed to the stock of knowledge about the sector. The combination of stakeholder consultations and internet mediated research (IMR) led to the identification of knowledge gaps across key areas of the research. These gaps informed the selection of the primary research activities that are detailed in this attachment.

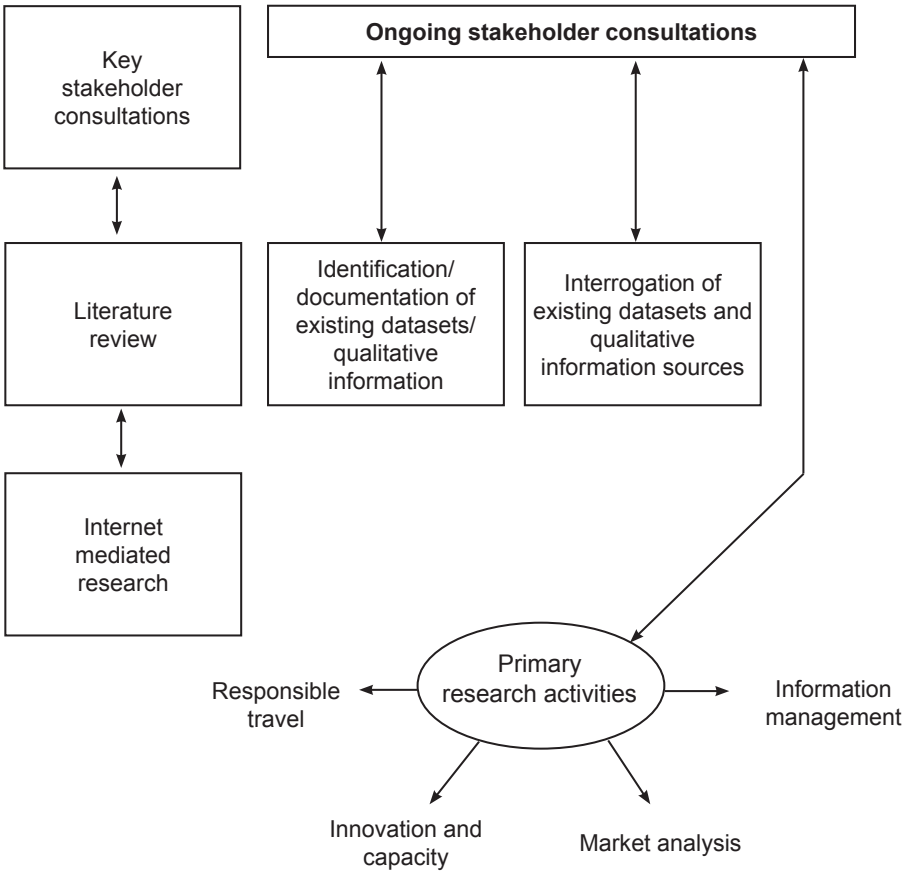


Figure 7: Schematic of research methods for On Track

Methods used by the information management theme

The information management methods relate to four areas:

- collation and analysis of available secondary data
- trip patterns surveys in destination
- spatial analysis of trip itineraries
- route selection modelling.

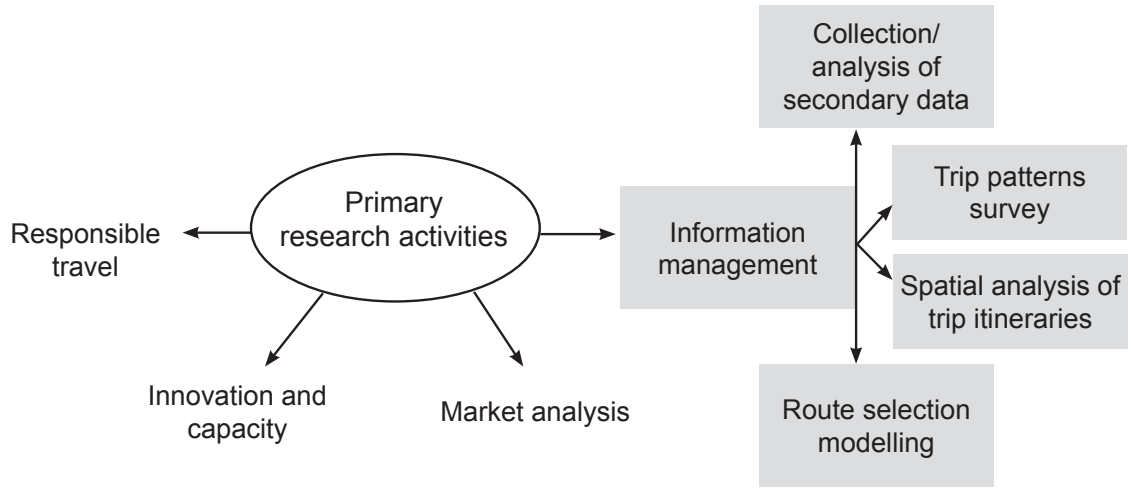


Figure 8: Methods for information management

Collation and analysis of existing data sources

A number of secondary datasets provided the bulk of the data used for analysis. Table 9 below provides meta-level information about these. After the table brief documentation is provided about each collection including where to source the data for future research.

Table 9: Secondary datasets used for analysis in Stage 1

Dataset	Custodian	Data type	Currency	Applications
National Visitor Survey (NVS)	Tourism Australia	Unit record files	2000–2005	Market size, source markets, visitor characteristics, trip patterns, comparisons to other markets, activities, accommodation, travel parties
International Visitor Survey (IVS)	Tourism Australia	Unit record files	2000–2005	Market size, source markets, visitor characteristics, trip patterns, comparisons to other markets, activities, accommodation, travel parties
Northern Territory Tourist Monitor (NTTM)	Tourism NT	Unit record files	2000–2004	NT market size, characteristics, trip patterns, comparisons to other markets, international v domestic comparisons, expenditure on trip, daily expenditure, expenditure attribution, activities, accommodation, travel parties
Hema Maps facilities	Hema Maps	Point data in layers	At June 2006	Visualisation of trip patterns, analysis of desert infrastructure
Hema Maps points of interest	Hema Maps	Digitised point data in layers	At June 2006	Visualisation of trip patterns, analysis of desert infrastructure
New motor vehicle registrations	Australian Bureau of Statistics	Data cubes, Excel spreadsheets	Monthly 1980–2007	Vehicle type (passenger vehicles, other vehicles), make and model , state of registration
VFACTS	Federal Chamber of Automotive Industries	Online reports	Monthly 2001–2007	Vehicle sales by maker, segment and production volumes
AVSTATS – airport traffic data	Bureau of Transport and Regional Economics	Excel spreadsheets	Annual 1995–96 to 2005–06	Individual airport activity trends (aircraft numbers and passenger numbers) including desert-located airports
AVSTATS – domestic airfare index	Bureau of Transport and Regional Economics	Excel spreadsheets	Monthly October 1992 to August 2007	Assessing relative costs of different transport modes, analysis of trends in air transport
AVSTATS – International and domestic airline activity	Bureau of Transport and Regional Economics	Excel spreadsheets	Monthly and annual	Transport analysis, impacts of service changes, infrastructure investments
Sensis Yellow Pages business listings NT	SENSIS	Excel customised spreadsheet	1999–2003	Analysis of business types and clustering, trend analysis of economic activity in remote areas
Average annual daily traffic counts NT	NT Department of Planning and Infrastructure	Excel spreadsheet	2001–2004	Analysis of traffic flows, scenario modelling

IVS, NVS and NTTM

The two major national tourism data collections are the International Visitor Survey and the National Visitor Survey. Both have included questions related to the use of 4WD vehicles over the past two or three years, but the data quality has been poor and the sample size for visitors to desert Australia has been low. Tourism NT, the state tourism organisation for the Northern Territory, conducted an annual survey of visitors between 1998 and 2004. This survey included questions both about the use of a 4WD vehicle and whether four wheel driving was an activity undertaken during the visit to the Northern Territory. While it is possible to assess whether a 4WD vehicle was used to travel to those Northern Territory destinations that are in the desert, it is not possible to assess whether the four wheel driving activity was done in the desert or elsewhere in the Northern Territory. The data collection was

discontinued after 2004. The Northern Territory and each of the states now conduct 'destination-based surveys' which are samples of visitors in specific locations. Data items differ between states and, in some cases, locations within states or territories. The Northern Territory destination-based survey program is in its early stages. Pilot collections have been held in Alice Springs and Tennant Creek, but it is not known whether other desert destinations have been included. Data has not yet been released, so it is not known whether any data items relate to 4WD tourism.

The unit record files from each of these datasets were manipulated and analysed largely using SPSS (Statistical Package for the Social Sciences, a program for analysing statistics). Geographic identifiers include the statistical local area of each overnight stop. This enabled an analysis of desert-based travel and trips and comparisons between those who used a 4WD vehicle and those who did not. Scripting (an SPSS function) was required in many cases to suitably codify datasets for analysis and reporting. These are contained with the datasets themselves in the On Track files collection under 'data'.

Hema Maps datasets

Under an agreement with Hema Maps, two comprehensive point file databases with geographic locators for tourist infrastructure, tracks, towns, commercial facilities, settlements and other sites were provided for use by the project. Dataset attributes are provided below. The agreement for the use of this dataset is under exclusive licence and strict conditions of use apply. This dataset is not available for public use or for public distribution. A copy of the licence agreement is held in the On Track files collection under 'Hema Maps'.

Dataset attributes

A. Facilities file

Data type: Point

Data has been acquired from the following sources:

1. Tourist information centres, roadhouses, service stations and homesteads were contacted by phone to confirm the current facilities available at a locality.
2. Hema Maps fieldwork

Accuracy: Positional information for the facilities database has been primarily created by using the locality layer from the Geoscience Australia Series 2 Geodata. When information is not available from the Geocience dataset Hema fieldwork information has been used. The information gathered from the various locations is updated every two years.

Attribute	Data Type	Length	Description
Latitude	Float		Latitude (decimal degrees)
Longitude	Float		Longitude (decimal degrees)
Lat_DMS	Char		Latitude (degrees, minutes, seconds)
Long_DMS	Char	15	Longitude (degrees, minutes, seconds)
FEAT_CODE	Char	50	Feature code
NAME	Char	100	Name
LOCALITY	Integer		Locality
Contact_Name	Char	100	Name of person/place contacted
Contact_Date	Date		Date of most recent facilities check
Contact_Number	Char	15	Phone number for person/place contacted
Police_Station	Logical		Police station
Post_Office	Logical		Post office
Visitor_Info_Centre	Logical		Visitor information centre
General_Store	Logical		General store
Medical_Facility	Logical		Medical facility
Park_Ranger	Logical		National Parks ranger
Parks_Office	Logical		National Parks office
Airfield_Airstrip	Logical		Airport/airstrip
Hotel_Motel	Logical		Hotel/motel style accommodation
Carvan_Park_Sites	Logical		Caravan park
Cabins	Logical		Cabin style accommodation
Camping_With_Facilities	Logical		Camp ground with facilities
Bush_Camping	Logical		Camping with no facilities
Meals	Logical		Meals available
Drinking_Water	Logical		Drinking water available
Fuel_hours_Mon_to_Fri	Char	50	Opening hours for fuel – Monday to Friday
Fuel_hours_Sat_Sun	Char	50	Opening hours for fuel – Saturday and Sunday
Leaded	Logical		Leaded fuel available
Unleaded	Logical		Unleaded fuel available
Diesel	Logical		Diesel fuel available
Auto_LPG_Gas	Logical		LPG autogas available
Avgas	Logical		Avgas (for aircraft) available
Bottled_Gas	Logical		Bottled gas available
Mechanical_Repairs	Logical		Mechanical repairs
Tyre_Repairs	Logical		Tyre repairs
Public_Phone	Logical		Public phone
Public_Internet_Access	Logical		Public internet access
EFTPOS	Logical		EFTPOS available
Credit_Card_Facilities	Logical		Credit Card Facilities Available
ATM_Bank_Facilities	Logical		ATM/Banking Facilities Available
Website	Logical		Website contact
Email	Logical		Email contact
Web_Address	Char	50	Website address
Email_Address	Char	50	Email address
Comments	Char	254	

Data currency: Beginning date: 2003 Ending date: Current

Dataset status: Progress: In progress Maintenance and update frequency: 2 Years

B. Points of interest file

File names: Hema_GPS_Points_point

Data type: Point

Data has been acquired from the following sources:

- digitised from Geosciences Australia raster maps
- digitised from point data acquired during fieldwork
- extracted from Geosciences Australia Series 2 Geodata.

Accuracy: The information in this table may be variable depending on its original source as described above.

Notes: This database is a work in progress and there is still refinement to be done to the categories. The point information has often been placed in the generic point of interest category.

The data contains the following categories:

- bench mark
- blaze tree
- bore
- bush camp
- camping area
- creek crossing
- ford
- gate
- gorge
- homestead
- locality
- monument
- oil well
- place name
- point of interest*
- populated place
- railway siding
- rest area
- road junction
- roadhouse
- rockhole
- sand dune
- spring
- star picket (from seismic lines)
- survey peg
- trig station
- waterhole
- water point
- way point
- well
- wind pump

* The points of interest category contains information that needs to be further categorised.

Attribute	Data type	Length	Description
Latitude	Decimal	13, 6	Latitude (decimal degrees)
Longitude	Decimal	13, 6	Longitude (decimal degrees)
Lat_DMS	Char	15	Latitude (degrees, minutes, seconds)
Long_DMS	Char	15	Longitude (degrees, minutes, seconds)
Category	Char	50	Category
Name	Char	15	Short name
Aux_1	Char	20	Auxiliary information
Aux_2	Char	20	Auxiliary information
Aux_3	Char	12	Auxiliary information
LongName	Char	100	Long name
Memo	Char	254	Comments

Data currency: Beginning date: 2000 Ending date: Current

Dataset status: Progress: In progress Maintenance and update frequency: As required

New motor vehicle registrations – These are available free of charge online at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/9314.0?OpenDocument

VFACTS – Vehicle sales reports are available free of charge online at: http://www.fcai.com.au/sales. Customised data runs are possible on a pay for service basis to identify individual makes and models.

AVSTATS – Airport traffic data, domestic airfare index, international and domestic airline activity is available free of charge online at: http://www.btre.gov.au/info.aspx?NodeId=5. Airport traffic data is in PDF format that requires transcription for analysis.

Sensis Yellow Pages business listings – This dataset is a custom data run that lists business types by postcode. Listings are by the main category of business type that the entity placed its advertisement in the Yellow Pages. A single business can list in multiple categories, so these data are not suitable for estimating business numbers. The dataset is stored in the On Track folders.

Average annual daily traffic counts NT – This is a custom data run provided by the Transport Team at the NT Department of Planning and Infrastructure. The accuracy of individual counters varies and data collection is less frequent in remote areas and away from major roads. Seasonal impacts can be seen in the data and an averaging of counts from individual counters provides the best annual measure. The dataset is stored in the On Track folders.

Trip patterns survey

A survey instrument (Desert travellers' survey) was designed specifically to be implemented with 4WD travellers at desert destinations during their trip. It describes trip patterns, reasons for selecting particular destinations and matches these with broad market segments. Importantly, it describes expenditure patterns for the trip and for individual destinations visited during the trip. It is particularly useful to enhance the visitor flows application as it can be implemented during periods of change (new product, track closure, new marketing campaign etc.) to assess the impact of the change on visitors' decisions to visit particular places and use particular routes. This instrument was administered to a small sample of travellers (60 in total) staying at caravan parks in Alice Springs. A more complete implementation strategy will be proposed if the data proves useful for the visitor flows application.

This destination-based survey of desert travel parties targets travellers on trips for the purpose of leisure or a holiday with a total trip itinerary of five nights or longer. It captures information on the specific activities undertaken on, or planned for, the current trip, the importance of desert trips have compared to other four wheel driving environments, planning processes and information sources. The survey also features two complex survey instruments: a visual trip representation and an economic attribution matrix. The survey form is shown below.

The visual representation is aimed at providing researchers with an understanding of trip itinerary patterns, entry and exit points to the desert and repeat visits to individual destinations. It consists of a map of Australia on which respondents are asked to plot out the trip route, stopover destinations, and the number of nights at each stopover and whether they have been to that destination on a previous trip. A relatively high number of people (26%) did not respond to this component of the survey and respondents also represented their trip on the map inconsistently.

The economic attribution matrix sought to find out where people purchased particular items for their trip and which items were commonly purchased in desert or remote locations. The broad locations were 'before leaving home', 'at major towns' and 'at remote places'. The matrix that would be required to collect the actual monetary expenditure on individual items was considered too complex to attempt.

Two methods were used to distribute this self-completion survey. Firstly, forms were handed out at driver training workshops conducted by Direct 4WD at a caravan park in Alice Springs. Respondents who were involved in this research had enrolled in the formal training course provided by the company and were invited to fill out the survey form which was incorporated with their course materials. Forms were then collected by the instructor and returned securely to the researchers. The second method was to leave forms with an overview of the project, a survey information sheet and a pre-paid return envelope at the reception of caravan parks and other convergence points for 4WD travellers in central Australia

(e.g. roadhouses). This method has yielded only a handful of responses to date. Ethics approval for the conduct of this survey was given by the Charles Darwin University Human Research Ethics Committee (H06015).

Desert Travellers Survey

This survey is part of the 'On Track' research project which is about developing an understanding of the possible contribution of tourism to the livelihoods of desert communities in Australia. As a desert traveller, your input is valuable so please take a moment fill out this survey and map. More information is available from the information sheet which is available for you to take with you. If you have any more questions please ask your guide/ trainer or contact Andrew Taylor (head researcher) using the details on the information sheet.

About You

Q1 Please indicate your gender.
- *Male* ☐
- *Female* ☐

Q2 What is the postcode where you live? ☐

Q3 What is your age in years? ☐

Q4 Which of the following best describes your household structure? (*tick one only*)
- *Living alone* ☐
- *With a spouse/ partner and children* ☐
- *With a spouse/ partner (no children)* ☐
- *Single parent with children (no spouse/partner)* ☐
- *With parents or relatives* ☐
- *With unrelated people* ☐
- *Other* ☐

About This Trip

Q5 On this trip, how many nights in total will you be away from home? **(*If less than 5 then please go to the end*)** ☐

Q6 Please indicate whether you have done or intend to do ('Yes'), have not done ('No') or might like to do any of the following activities ON THIS TRIP (*tick one box for each activity*).

	Done	*Not done*	*Might like to do*
Challenging 4WD tracks	☐	☐	☐
A Tag-along 4WD tour	☐	☐	☐
A guided 4WD operator tour	☐	☐	☐
Other guided tour	☐	☐	☐
Bushwalking along a trail	☐	☐	☐
Nature-based activities (e.g. birdwatching)	☐	☐	☐
A Bush tucker tour	☐	☐	☐
A guided tour on Aboriginal land	☐	☐	☐
Visit a working station (e.g. camel/ cattle)	☐	☐	☐

Q7 Are you planning to go off the bitumen and engage 4WD in a desert area on this trip? (*tick one only*)
- *Yes* ☐
- *No* ☐

Q8 Please now turn over the page and complete the map using the instructions provided. Please make sure you return to this page and continue at Question 9 when you have finished the map.

4WD Preferences

Q9 In the last 5 years, how many trips of 5 nights or more have you taken to each of these environments? (*tick one only*)
- *Desert* ☐
- *Alpine* ☐
- *Beach* ☐
- *Other outback* ☐
- *Rainforest* ☐
- *Savannah* ☐

Q10 How regularly did you use a 4WD vehicle for these trips?
- *Always* ☐
- *Mostly* ☐
- *Sometimes* ☐
- *Never* ☐

Q11 Which of the following mostly applies to you when you go on 4WD trips of 5 days or more? (*tick one only*)
- *I always tend to go to the same places* ☐
- *I have a favourite trip but sometimes try new ones* ☐
- *I have a set of favourite trips I select from* ☐
- *I go wherever the group decides* ☐
- *I always like to try a new trip* ☐

Planning and Spending on This Trip

Q12 How many weeks ahead did you plan THIS TRIP? ☐

Q13 What information sources did you use to plan THIS TRIP? (*tick all relevant answers*).
- *Web sites* ☐
- *Brochures* ☐
- *4WD magazines* ☐
- *Travel books, maps or guides* ☐
- *State or local tourism authorities* ☐
- *Visitor Information Centres* ☐
- *Travel agent(s)* ☐
- *Club newsletter(s)* ☐
- *Motoring association* ☐
- *Word of mouth* ☐

Q14 How much ($Aud) have you budgeted in total for THIS TRIP? ☐

For this trip, please tick the items you have spent money on or intend to spend money on:

1. Before you left home.

2. At major towns (eg Alice Springs, Broken Hill, Broome or Cairns).

3. At smaller remote and outback towns or communities.

Q15

	Before leaving home	*At major towns*	*At remote places*
Vehicle parts or spares	☐	☐	☐
Mechanical repairs or servicing	☐	☐	☐
Recovery equipment	☐	☐	☐
Fuel	☐	☐	☐
Food	☐	☐	☐
Maps and touring guides	☐	☐	☐
Arts or craft	☐	☐	☐
Souvenirs	☐	☐	☐
4WD Tours	☐	☐	☐
Other tours	☐	☐	☐

Thank you for your assistance. Please now return your form.

Spatial analysis of trip itineraries

Most definitions of tourism describe the short-term movement of people away from their usual place of residence for at least one night. The spatial and temporal attributes associated with these movements combine to form the trip itinerary which tourism commonly analyses according to key elements:

- transport mode from origin to first stopover
- transport mode between stopovers
- transport mode from last stopover
- location of stopover
- accommodation on stopover
- activities at stopover.

An itinerary may be pre-planned with some elements pre-booked. It may also evolve and change during the course of the trip. Leaving aside day trips, the base unit of an individual itinerary is an overnight stop, of which there must be at least one. Stops can include nights in transit or nights spent on particular modes of transport such as long-haul buses. By definition, an overnight stop cannot be recorded as part of the itinerary until it has occurred. Hence, unless a record of the traveller's pre-planned overnight stop locations is available (from sources such as accommodation booking systems and phone call records) and it is known that the traveller will not deviate from this plan, only incomplete information exists about itineraries prior to trips being completed. This makes the short-term movements of individual travellers inherently unpredictable and predicting individual traveller behaviour almost impossible.

Post-hoc itinerary information is available from a sample of domestic and international travellers in the NVS and IVS datasets. By manipulating the unit record files from these datasets, geospatial elements of place, distance and time can be combined with information about transport, accommodation and activities to form information rich representations of visitor flows. On Track researchers developed methods for (1) the spatial analysis of trip itineraries and (2) route selection modelling. These techniques allow for visualisation of results to provide insights into:

- linked destinations – identification of pairs of destinations and the order of visitation
- dispersal – progressive movements of visitors out from or into a selected destination
- touring route models – division of use between alternative touring routes
- flow lines – aggregations of individual itineraries to highlight the main flow lines and deviations from these
- entry and exit corridors – location and method of passing from one region of interest to another (for example, from a non-desert region to a desert region and vice versa)
- hot spots – roads or tracks most frequently used between pairs of destinations.

The preliminary methods for geocoding trip itineraries for spatial representation involve the application of SPSS script to the NVS and IVS datasets to identify the number of 'records of interest'. These records are those of visitors whose itinerary includes at least one night in a desert region and at least one segment of self-drive travel to reach a desert stopover. For international travellers it is possible to identify whether the mode of transport used to reach the stopover was a 4WD vehicle but this information is not collected for domestic travellers. This method was applied to the available data from previous years to provide a segmented database of desert-self drive records. The results of the database segmentation for the years 2001 to 2005 are shown in Table 10 below. Having established that the numbers and proportions of desert self-drive records are relatively consistent across the years 2001 to 2005 (allowing for sample size changes), records from the 2005 datasets were used to develop and refine geocoding techniques which were subsequently applied to data for other years.

Table 10: Records of interest for visualising traveller information

	2001		2002		2003		2004		2005	
	NVS	IVS	NVS	IVS	NVS	IVS	NVS	IVS	NVS	IVS
Total records	27 662	20 383	27 659	20 182	26 982	20 670	27 948	20648	32 217	37 989
Records (no.)	1 446	1 102	1 425	1 265	1 495	1 152	1 454	1 415	1 971	3 199
Desert records (%)	5.20%	5.40%	5.20%	6.30%	5.50%	5.60%	5.20%	6.90%	6.10%	8.40%
Drive records	1 134	n.a.	1 095	n.a.	1 174	883	1 120	840	1 497	2 037
Drive records (%)	78.40%	n.a.	76.80%	n.a.	78.50%	76.60%	77.00%	59.40%	76.00%	63.70%

Consecutive overnight stops are recorded in the NVS and IVS datasets at the Statistical Local Area (SLA) level. Records of interest were geocoded to this level of geography in desert regions and across the Northern Territory; however, to reduce processing and coding burden, SLAs in the more heavily populated urban areas were amalgamated, generally into tourism regions. For example, all SLAs contained within the Sydney tourism region were amalgamated to form a geographic unit for representation.

Some desert SLAs represent very large areas of land and contain several towns where visitors could possibly have stayed overnight. For this exercise the main road network was overlaid and an urban centre/locality assigned to represent the overnight stop. The process of assigning a single urban centre locality to represent all stops in the SLA was based on the best available knowledge of self-drive visitor patterns in the area, including the local knowledge of researchers and members and the advice of the On Track Knowledge Community. In addition, information obtained from web sites and other datasets such as Hema Maps (which provides data on available infrastructure, attractions and services) was considered to help determine towns in the SLA which might be more likely to attract an overnight stop compared with others that could be reached within a reasonable amount of driving time.

The locations of overnight stops were obtained using the boundaries for Urban Centre and Locality (UCL) areas provided by the Australian Bureau of Statistics. UCL boundaries were intersected with the roads dataset and junctions with the highest road priority were selected for stop locations. When the records of interest were geocoded, a number of coding errors were identified in the IVS and NVS datasets. These included travellers who indicated they drove to islands and others who appeared to drive to the other side of the continent for one night before returning to continue their journey the next day. These were examined on a case by case basis and most were filtered out of the dataset through the use of scripting.

The road network was constructed from Geoscience Australia Geodata Topo 250K V3 Series data for highways, roads and tracks. A priority attribute was assigned to each line segment ranging from highest (highways) to lowest (tracks). After manual cleaning of the road layers to join segments, a road network was built using ArcGIS network analysis software. It was assumed that travellers prefer highways over other roads, which may not be true for recreational travellers. Figure 9 outlines the order of, and interrelationships between, the methods used for information representation.

A demonstration project was undertaken to show DKCRC stakeholders some of the findings from the On Track project and some potential applications for desert communities. The demonstration was based on ‘fly through’ and user directed pathways which follow the paths of visitors on their trips, or follow one of Australia’s famous desert tracks. Tracks included the Strzelecki Track, Tanami Track, Canning Stock Route, Anne Beadell Highway, Birdsville Track, Oodnadatta Track and the Gunbarrel Highway.

Spatial data was combined with visitor survey data and findings from the research to produce an internet-based demonstration package. It was developed and programmed to run in Google Earth and Google Maps. The spatial data processing included:

- point locations of towns and attractions ‘nudged’ as needed to overlay the imagery
- Hema maps infrastructure locations
- the locations of road coordinates from Geoscience Australia were processed in ArcGIS to make a continuous line from segments by removing offsets and junctions. These were imported into Google Earth Pro, saved as .kml and edited to form paths.
- the development of paths for the eight desert tracks listed above.

Stop location information, transport to stops, activities and accommodation at stops were extracted from the NVS and IVS. The information from the eight IVS was overlaid on Google Earth. Regions were used in Google Earth to control the number of icons shown at different zoom levels, this helps to reduce ‘clutter’. Icons were used from the Google Earth community. Different icons were used to differentiate the start and end points of individual trips from stopovers along the route. Macros were created in MS Excel to reformat the visitor survey data so that the information can be imported as a shape file into Google Earth.

Route selection modelling

After cleaning the survey records, the locations of the assumed overnight stops indicated in each survey were produced as stop files (a stop file is a database of locations where travellers stop along a network in the format required for use in the ArcGIS network analysis software). These stop files, together with the road network, were used to create individual route segments using ArcGIS. Individual records were assigned to road segments and segments were summed to provide a collective picture of visitor patterns in desert Australia. A procedure was developed to determine direction of travel and information was compiled for key intersections in desert Australia. Figure 9 depicts the coding and data transformation methods used for spatial analysis and route selection modelling for desert self-drive travellers.

Methods used by the market analysis theme

The literature review highlights that there is a lack of information about desert 4WD travel markets. Very little information is available about market volume, market origins, market trends, market composition, aspirations of the market and motivations. This part of the On Track research is interested in establishing whether segments of 4WD travellers can be identified, with a view to understanding those most likely to undertake trips including desert areas, where market opportunities may exist, and how to target marketing and product development activities to access these opportunities. Qualitative and quantitative research methods were applied. Human Research and Ethics Committee applications were submitted and approved for all activities described in this section.

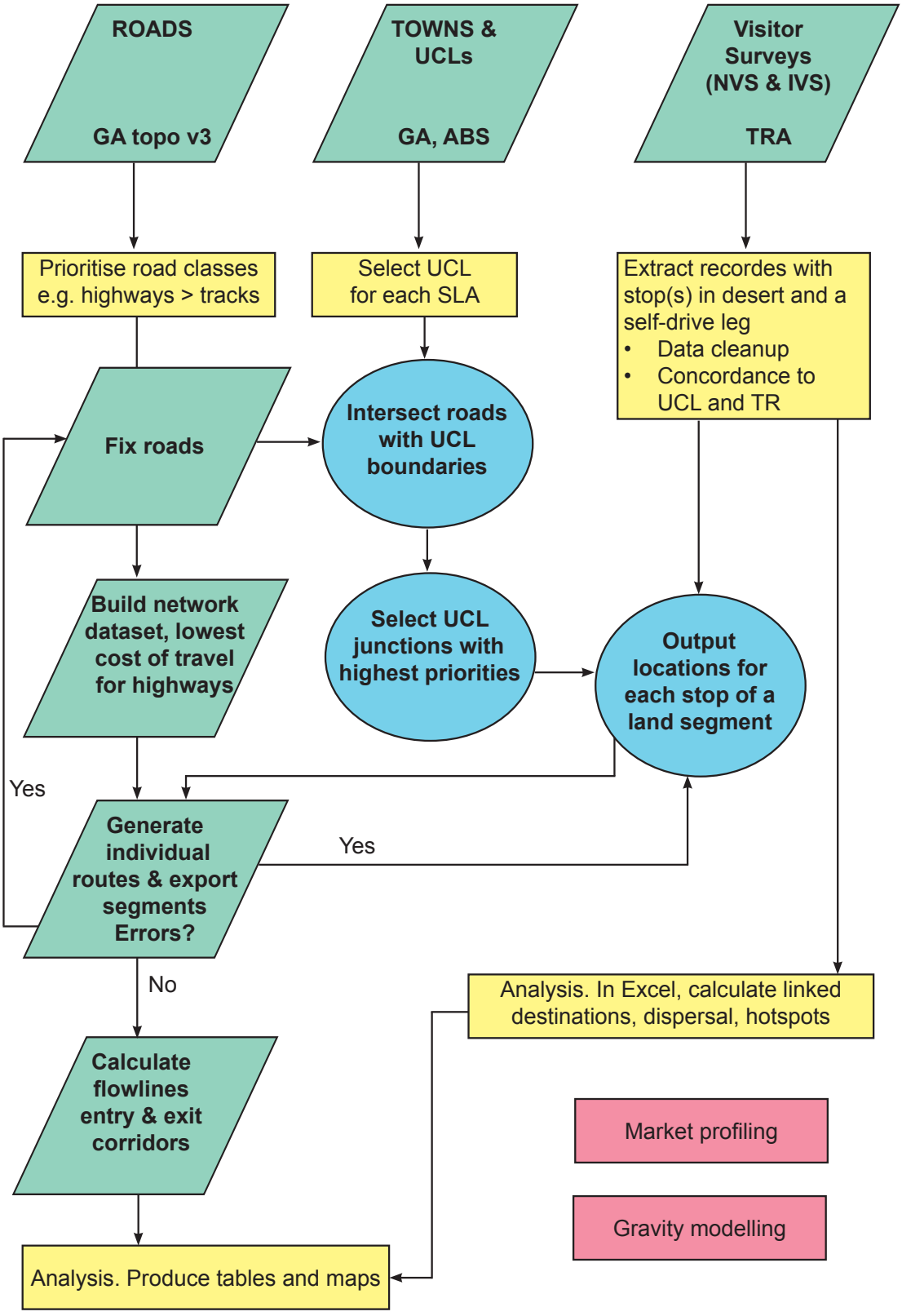
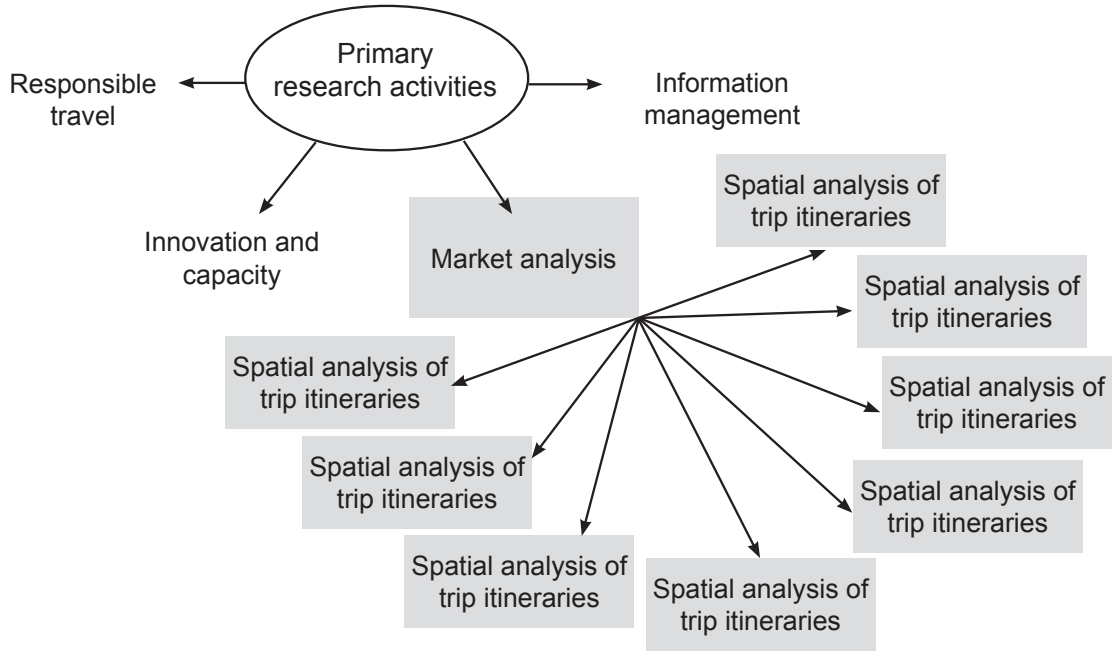


Figure 9: Overview of visitor flows processing

Figure 10: Research activities for market analysis



Analysis of secondary data sources

The secondary datasets described in the previous section were manipulated and analysed to describe the existing and potential markets for desert 4WD tourism.

Focus groups

Focus groups are one method researchers can use to observe and discuss attitudes, perceptions and the feelings of target populations. On Track also needed to document and become familiar with the discourse used by 4WD enthusiasts, particularly around desert trips. Focus groups were viewed as an essential prelude to targeted quantitative market research (Krueger 2000). Two focus groups were convened that were comprised of 4WD owners.

A focus group protocol was designed to investigate traveller's motivations for taking 4WD trips, the product and experience preferences of travellers, perceptions of negative aspects of 4WD travel and attitudes towards interaction (personal or commercial) with Aboriginal communities and culture. Two focus groups were conducted with members of Victorian 4WD recreation clubs. The resulting insights informed the development of the more quantitative consumer surveys. They also led to the proposition that the 4WD market for desert Australia could be broadly segmented to allow differentiation of the development potentials of destinations and marketing strategies.

FWDV recruited participants for the focus groups by contacting club secretaries and committee members of several 4WD clubs in the state. A purposive sample of clubs was contacted to generate the participation of individuals from a mix of club 'types'. Club types were loosely differentiated based on advice from FWDV and on the basis of the make of vehicle (for model or manufacturer specific clubs), the life stage (young couple, family with children, etc) groups common to members and the types of trips and activities regularly undertaken by members. For example, the Toyota Hilux 4X4 Club of Victoria organises short trips to rugged terrain environments and tends to attract young members and young families while the Idlers four wheel drive club of Victoria targets retired and semi-retired people and conducts extended trips including trips to desert areas. This process was not aimed at producing a representative sample of participants, but broadening the likely range of views, attitudes and discourse.

Bruce Prideaux and Ali Coghlan from James Cook University and Andrew Taylor from Charles Darwin University facilitated two successive sessions. The format of the sessions was as follows:

- welcome and researchers introduced
- administrative arrangements
- introduction to the On Track project
- description of focus group aims
- description of focus group format
- reading out individual questions to all participants
- individual respondents write answers below the question on sheet provided
- facilitated group discussion of individual answers
- recap and discuss issues raised during facilitated group discussions.

The topics of the individual questions were:

- motivations for 4WD trips
- preferred experiences on trips
- activities undertaken on 4WD trips
- negative aspects of four wheel driving and perceptions of remedial actions required
- destination and accommodation selections
- the ideal 4WD experience
- perceptions of interactions with Aboriginal communities and individuals.

Focus group demographic composition

	Group 1 (140 minutes)	Group 2 (128 minutes)
Males	6	4
Females	3	3
Broad age groups	All aged over 50	One aged less than 40, remainder over 50 years

Participants were asked to sign a statement of consent permitting researchers to keep records in the form of the written answers, notes taken during group discussions and a digital recording. The Charles Darwin University Human Research Ethics Committee gave ethics approval for the conduct of this research (H06002).

Focus groups instrument

Thank you for your valuable time in assisting the research team with this project.

The end results of this research are designed to increase our understanding of 4WD tourism and provide better information to the various groups, public and private, that have an interest in this aspect of tourism. The format for today's session will be for you to write your thoughts on each topic which we will then discuss.

What types of 4 WD experiences do you prefer? …….

……..….

What activities do you enjoy participating in during 4 Wheel Driving?

1. ……..

2. ……

3. ……..

4. ……..

5. ……..

Why do you go 4Wheel Driving?

1. ……..……

……..

2. ……..

..……

3. ……..

……..

4. ……..

……..

5. ……..

……..

List any aspects of 4Wheel Driving you don't like.

1. ……..

……..

2. ……..

..……

3. ……..

……..

4. ……..

……..

5. ……..

……..

What forms of accommodation do you use when 4Wheel Driving?

……..

……..

List any remedial action that is required to make 4Wheel Driving a more enjoyable experience (this can be by the government or the private sector).

……

……

……

……

Are there any specific factors that you consider when selecting a 4WD destination?

……

……

……

What aspects of 4W Driving do you enjoy the most?

……

……

……

For you, what is the ideal 4WD experience?

……

……

……

Market segmentation surveys

Several short survey instruments were developed to assist in ascribing 4WD travellers to one of the three broad market segments that emerged from the focus group research. The aim of these surveys was to identify the proportion of 4WD consumers who belonged to each segment and to determine the level of demand for desert 4WD experiences. The surveys also collected a small amount of information about trip planning and the attention paid to responsible travel issues. The surveys were conducted at 4WD or caravan/camping exhibitions: one each in Wandin (Victoria), Brisbane, Adelaide and Sydney. The instrument was refined after each implementation. The instrument can now be used with other groups of 4WD travellers (international hire car travellers, customers of caravan parks, special interest group members, 4WD vehicle purchasers etc.) to develop a more complete profile of the market.

Each state capital city in Australia hosts at least one major event a year featuring four wheel driving, 4WD vehicle sales and displays, 4WD accessories and mobile accommodation for touring or 4WD travel. On Track researchers conducted interviews with attendees at four shows during 2006: the Victorian 4WD Show, National 4X4 Shows in Brisbane and Sydney and the 4WD and Adventure Show in Adelaide. Industry members of the project steering committee suggested that these shows were venues from which a sample of 4WD enthusiasts could be drawn efficiently and effectively. Formal applications to conduct each survey were approved by the Charles Darwin University Human Research and Ethics Committee (H06002 and H06003).

Feedback from the focus groups and consultation with FWDV guided the development of the first short survey questionnaire. It was administered at the Victorian 4WD Show held at Wandin (Victoria) in February 2006. Pilot surveys were completed with several staff members at Charles Darwin University who were known 4WD enthusiasts. The aim of this survey was to collect data about:

- demographic characteristics of respondents
- number and length of 4WD trips
- trip location choice
- trip environments
- trip parties
- trip planning, information sources and preparation.

Two versions of the survey form were used at Wandin: an interviewer administered and a self-completion form (see Wandin show survey below). Self-completion forms were left at the Land Rover Owners Club of Victoria stall with instructions and a project information sheet. Volunteer interviewers recruited by FWDV were briefed on the nature and purpose of the survey and then actively encouraged browsing show attendees to self-complete the form. These were collected by volunteers and placed in secure boxes before being returned to the researchers who were on site. Attendees were approached unsystematically based on their availability (for example, not engaged in discussion with others, not eating). An introductory statement was provided by the interviewer before permission was sought to conduct an interview.

A similar process was used at the National 4X4 Show in Brisbane during April 2006 after some relatively minor changes were made to the questionnaire and methodology (see Brisbane show survey below). No self-completion surveys were made available at this venue. A question was added which sought to establish whether the main motivation for 4WD driving was testing the vehicle capacity, getting to places for activities or using the vehicle to explore places. This question was an iterative development based on the results of the focus groups and Wandin show survey.

Interviewers were based at the Hema Maps stall for the Brisbane show. It is not expected that this introduced a results bias since it was unlikely that any attendees were present solely to visit that stall or that the Hema Maps stall attracted enthusiasts with different attributes relative to other stalls or other

attendees in general. However, it is recognised that results for the question about how often (always, sometimes, never) maps are used for planning 4WD trips may have been influenced by the location of the interviewers.

In June 2006 researchers conducted surveys at the National 4X4 Show in Sydney. A revised questionnaire was administered which included questions on 4WD vehicle ownership, levels of 4WD training and driver experience, 4WD holidays and off-road driving in individual environments, attitudes to driving off the bitumen in outback areas and factors which would encourage this (see Sydney show survey below). The survey was administered using the same methods as used in Brisbane with interviewers based at the Hema Maps stall. Questions about information sources and trip planning were dropped as there was a high level of consistency between answers from the Wandin and Brisbane shows and it was felt that other areas of investigation warranted a higher priority.

Research at the 4WD and Adventure Show in Adelaide in October 2006 focused on desert-specific topics including the relative importance of desert trips in the overall leisure trip cycle of respondents, desert trip patterns and activities undertaken on desert trips (see Adelaide show survey below). The survey included a screening question to identify respondents who had recently been on a desert 4WD trip or were planning such a trip in the near future. Surveys were conducted by On Track researchers and volunteers based at the South Australian Four Wheel Drive Association stall. Numbers of completed responses for each survey can be seen in Table 11 below. Records of refusals were not kept.

Table 11: Numbers of completed consumer show surveys

Show	Males	Females	Total
Victorian 4WD Show	164	50	214
National 4X4 Show Brisbane	182	52	234
National 4X4 Show Sydney	171	21	192
4WD and Adventure Show Adelaide	96	23	119
Total	613	146	759

Wandin show survey instrument

Wandin 4WD Show Survey (interviewer version)

Interviewer name..... Time of interview.....

General Information

Q1 Is the respondent male or female?
- *Male* ☐ 1
- *Female* ☐ 2

Q2 What is the postcode where you live? ☐☐☐☐

Q3 What is your age in years? ☐☐

Q4 Which of the following best describes your household structure? (*tick one only*)
- *Living alone* ☐ 1
- *With a spouse/ partner and children* ☐ 2
- *With a spouse/ partner (no children)* ☐ 3
- *Single parent with children (no spouse/partner)* ☐ 4
- *With parents or relatives* ☐ 5
- *With unrelated people* ☐ 6
- *Other* ☐ 7

Q5 Do you belong to a 4WD/ off-road club or association?
- *Yes* ☐ 1
- *No* ☐ 2

Q6 How many times have you gone on a 4WD/ off-road trip in the past 3 years? (*if none please go to The End*) ☐☐

Q7 How many days in total was the longest of these trips? ☐☐

4WD/ Off Road Activities and Preferences

Q8 Do you try to take 4WD/ off-road trips when you travel? (tick one only)
- *Always* ☐ 1
- *Usually* ☐ 2
- *Only sometimes* ☐ 3

Q9 When you go on 4WD/ off-road trips do you: (*tick one only*)
- *Always tend to go to the same place* ☐ 1
- *Have a favourite trip but sometimes try new ones* ☐ 2
- *Have a set of favourite trips I select from* ☐ 3
- *Go wherever the group decides* ☐ 4
- *Always like to try a new trip* ☐ 5

Q10 Whose vehicle do you mostly travel in on your 4WD/ off-road trips? (*tick one only*)
- *Your own vehicle* ☐ 1
- *A friend's or relatives vehicle* ☐ 2
- *A hired vehicle* ☐ 3
- *An organised tour vehicle* ☐ 4

Q11 Do you have a preference for trips to these different types of places? (*tick one box for each type of place*)

	Strong preference for this environment	*Sometimes like to travel in this environment*	*Prefer not to travel in this environment*
Desert	☐ 1	☐ 2	☐ 3
Savannah	☐ 1	☐ 2	☐ 3
Beach	☐ 1	☐ 2	☐ 3
Alpine	☐ 1	☐ 2	☐ 3
Rainforest	☐ 1	☐ 2	☐ 3
Other outback areas	☐ 1	☐ 2	☐ 3

Q12 How regularly do you take each of the following types of 4WD/ off-road trips? (*tick one box for each type of trip*)

	Always	*Mostly*	*Sometimes*	*Never*
Trips with 4WD tour company	☐ 1	☐ 2	☐ 3	☐ 4
Club or association trips (multiple vehicles)	☐ 1	☐ 2	☐ 3	☐ 4
Trips with friends/relatives (multiple vehicles)	☐ 1	☐ 2	☐ 3	☐ 4
Single vehicle trips	☐ 1	☐ 2	☐ 3	☐ 4

Q13 When you are planning your trip(s) do you:

	Always	*Sometimes*	*Never*
Put together an emergency contingency plan?	☐ 1	☐ 2	☐ 3
Make sure you have any necessary permits	☐ 1	☐ 2	☐ 3
Obtain information from 4WDmagazines or club newsletters?	☐ 1	☐ 2	☐ 3
Obtain information from web sites?	☐ 1	☐ 2	☐ 3
Obtain information from people you know who have done the trip?	☐ 1	☐ 2	☐ 3
Obtain information from brochures or travel agents?	☐ 1	☐ 2	☐ 3

Q14 How important to you is modifying your vehicle? (tick one only)
- *Very important* ☐ 1
- *Somewhat important* ☐ 2
- *Not important* ☐ 3
- *Don't own a vehicle* ☐ 4

The End: Thank you for your help. Please help yourself to a copy of the project information sheet.

Brisbane show survey instrument

Brisbane National 4X4 Show Survey (interviewer version)

(Interviewer introduction)
My name is ___ and we are doing research on 4WD tourism in the desert. I would like to ask you some brief questions about your 4WD trips. By this I mean when you chose to use a 4WD vehicle for a trip because you thought such a vehicle would be needed, even if you did not end up using 4WD.

General Information

Q1 **Is the respondent male or female?**
Male ☐ 1
Female ☐ 2

Q2 **What is the postcode where you live?** ☐☐☐☐

Q3 **What is your age in years?** ☐☐

Q4 **Which of the following best describes your household structure? (*tick one only*)**
Living alone ☐ 1
With a spouse/ partner and children ☐ 2
With a spouse/ partner (no children) ☐ 3
Single parent with children (no spouse/partner) ☐ 4
With parents or relatives ☐ 5
With unrelated people ☐ 6
Other ☐ 7

Q5 **Do you belong to a 4WD club or association?**
Yes ☐ 1
No ☐ 2

Q6 **How many times have you gone on a 4WD trip in the past 3 years? (*if 0 go to end*)** ☐☐

Q7 **How many days in total was the longest of these trips?** ☐☐

4WD Activities and Preferences

Q8 **Do you always, usually or only sometimes try to take 4WD trips when you travel? (tick one only)**
Always ☐ 1 *Usually* ☐ 2 *Only sometimes* ☐ 3

Q9 **Which of the following most applies to you (*tick one only*). "To me, 4WDing is about..."**
Testing the capacity of the vehicle ☐ 1
Getting to places where I can do other activities (eg fishing or bushwalking) ☐ 2
Just getting out and about ☐ 3

Q10 **Which of the following MOSTLY applies to you when you go on 4WD trips: (*tick one only*)**
Always tend to go to the same place ☐ 1
Have a favourite trip but sometimes try new ones ☐ 2
Have a set of favourite trips I select from ☐ 3
Go wherever the group decides ☐ 4
Always like to try a new trip ☐ 5

Q11 **How strong is your preference for trips to these different types of places? (*tick one box for each type of place*)**

	Strong preference	*Sometimes travel*	*Prefer not to travel*
Desert	☐ 1	☐ 2	☐ 3
Savannah	☐ 1	☐ 2	☐ 3
Beach	☐ 1	☐ 2	☐ 3
Alpine	☐ 1	☐ 2	☐ 3
Rainforest	☐ 1	☐ 2	☐ 3
Other outback areas	☐ 1	☐ 2	☐ 3

Q12 **How regularly do you take each of the following types of 4WD trips? (*tick one box for each type of trip*)**

	Always	*Mostly*	*Sometimes*	*Never*
Trips with 4WD tour company	☐ 1	☐ 2	☐ 3	☐ 4
Club or association trips (multiple vehicles)	☐ 1	☐ 2	☐ 3	☐ 4
Trips with friends/relatives (multiple vehicles)	☐ 1	☐ 2	☐ 3	☐ 4
Single vehicle trips	☐ 1	☐ 2	☐ 3	☐ 4

Q13 **When you are planning 4WD trips do you always, sometimes or never do the following:**

	Always	*Sometimes*	*Never*
Put together an emergency contingency plan?	☐ 1	☐ 2	☐ 3
Make sure you have any necessary permits?	☐ 1	☐ 2	☐ 3
Make sure you have access to maps produced specifically for 4WD travel?	☐ 1	☐ 2	☐ 3
Obtain information from 4WDmagazines or club newsletters?	☐ 1	☐ 2	☐ 3
Obtain information from web sites?	☐ 1	☐ 2	☐ 3
Obtain information from people you know who have done the trip?	☐ 1	☐ 2	☐ 3
Obtain information from brochures or travel agents?	☐ 1	☐ 2	☐ 3
Obtain information from Visitor Information Centres?	☐ 1	☐ 2	☐ 3

Q14 **How important to you is modifying your vehicle? (tick one only)**
Very important ☐ 1
Somewhat important ☐ 2
Not important ☐ 3
Don't own a vehicle ☐ 4

Sydney show survey instrument

Sydney National 4X4 Show Survey (interviewer version)

My name is ___ and we are doing research on 4WD tourism on behalf of Charles Darwin University. I would like to ask you some brief questions about 4WDing.

Q1 Is the respondent male or female?
- *Male* ☐ 1
- *Female* ☐ 2

Q2 What is the postcode where you live? ☐

Q3 What is your age in years? ☐

Q4 What is your annual household income? ☐

Q5 Which of the following best describes your living arrangements? (*tick one only*)
- *With a spouse or partner and children* ☐ 1
- *With a spouse or partner but no children* ☐ 2
- *Single parent with children (no spouse/partner)* ☐ 3
- *Single living alone or sharing* ☐ 4
- *Single living at home* ☐ 5
- *With parents or relatives* ☐ 6
- *With unrelated people* ☐ 7
- *Not stated* ☐ 8

Q6 Which of the following best describes your employment status? (*tick one only*)
- *Employed full time* ☐ 1
- *Employed part-time or casual* ☐ 2
- *Retired or on a pension* ☐ 3
- *Looking for work* ☐ 4
- *Studying* ☐ 5
- *Mainly doing home duties* ☐ 6
- *Not stated* ☐ 7

Q7 Do you own a 4WD vehicle?
- *Yes* ☐ Go to Q8
- *No* ☐ Go to Q12

Q8 To me, the important aspects of owning a 4WD are: (multiple answers allowed)
- *It allows me to drive in challenging places off the bitumen by engaging 4WD* ☐ 1
- *It gets me to places where I can do other activities (like fishing)* ☐ 2
- *It is comfortable and roomy* ☐ 3
- *I feel safe in it* ☐ 4
- *I need the power to tow my caravan or boat* ☐ 5
- *It can be modified to suit my needs* ☐ 6

Q9 How long have you owned a 4WD vehicle?
- *Less than 6 months* ☐ 1
- *Less than a year* ☐ 2
- *One to two years* ☐ 3
- *More than two years* ☐ 4

Q10 Do you belong to a 4WD club or association?
- *Yes* ☐ 1
- *No* ☐ 2

Q11 Have you ever done any formal (competency-based) 4WD training?
- *Yes* ☐ 1
- *No* ☐ 2

Q12 Which of the following best describes your level of experience with 4WDing off the bitumen where you have engaged 4WD? (tick one box only)
- *Very experienced* ☐ 1
- *Reasonably experienced* ☐ 2
- *Limited experience* ☐ 3
- *Inexperienced* ☐ 4
- *Never done any off-road 4WDing* ☐ 5

Q13 In the past 5 years, which of the following best describes how often you have taken any holiday trips in a 4WD vehicle? (tick one box only)
- *At least once every month* ☐ 1
- *Once every two or three months* ☐ 2
- *Once every four to six months* ☐ 3
- *Once every year* ☐ 4
- *Once every 2 years* ☐ 5
- *Once every few years* ☐ 6
- *Have not taken any in the past 5 years* ☐ 7

Q14 Please tell us whether you have been on a holiday trip in a 4WD vehicle to the following environments in the past 5 years. We would also like to know whether you have done 4WDing off the bitumen there or might like to do 4WDing off the bitumen there. (*tick one box for each environment*)

	Been on holiday in 4WD	*Done 4WDing off road*	*Would like to do 4WDing off road*
Desert	☐ 1	☐ 2	☐ 3
Beach	☐ 1	☐ 2	☐ 3
Alpine	☐ 1	☐ 2	☐ 3
Rainforest	☐ 1	☐ 2	☐ 3
Other outback areas	☐ 1	☐ 2	☐ 3
Hinterlands	☐ 1	☐ 2	☐ 3
Savannah	☐ 1	☐ 2	☐ 3

Q15 Which of these best describes your attitude to 4WDing off the bitumen in outback areas of Australia? (tick one only)
- *I don't do 4WDing in outback areas (go to Q16)* ☐ 1
- *I deliberately plan to do 4WDing in outback areas* ☐ 2
- *I do it if only if a situation arises where I need to (for example in flooding)* ☐ 3
- *I only do 4WDing in outback areas to get to attractions or other sites* ☐ 4

Adelaide show survey instrument

Adelaide Show Survey (interviewer administered)

This survey is part of a national research project called "On Track", which is finding out how 4WD tourism in outback and remote areas of Australia can contribute to the livelihoods of communities and environments. Would you mind if I ask you a few short questions on 4WD trips to desert Australia?

Q1 Have you recently been on or are you planning to go on a 4WD trip which includes (ed) desert areas of Australia?
- *Yes (continue)* ☐ 1
- *No (end of survey)* ☐ 2

About you

Q2 Is the respondent male or female?
- *Male* ☐
- *Female* ☐

Q3 What is the postcode where you live? ☐

Q4 What is your age in years? ☐

Q5 Which of the following best describes your living arrangements? (tick one only)
- *With a spouse or partner AND children* ☐
- *With a spouse or partner but NO children* ☐
- *Single parent with children (no spouse/partner)* ☐
- *Single living alone or sharing* ☐
- *Single living at home* ☐
- *With parents or relatives* ☐
- *With unrelated people* ☐

Q6 Do you own a 4WD vehicle?
- *Yes* ☐
- *No* ☐

Q7 Do you belong to a 4WD club or association?
- *Yes* ☐
- *No* ☐

Q8 To you, which of the following describes the important aspects of owning a 4WD: (multiple ok)
- *It allows me to drive in challenging places off the bitumen by engaging 4WD* ☐
- *It gets me to places where I can do other activities (like fishing)* ☐
- *It is comfortable and roomy* ☐
- *I feel safe in it* ☐
- *I need the power to tow my caravan or boat* ☐
- *It can be modified to suit my needs* ☐

Q9 In general, how often do you drive off-road and engage 4WD?
- *Very often* ☐
- *Regularly* ☐
- *Only sometimes* ☐
- *Never* ☐

About your last/ planned desert trip

Q10 How many DAYS in total was your last trip(/planned) that included desert areas of Australia? ☐

Q11 How many DAYS were actually spent or (/planned) in desert areas? ☐

Q12 What is the MAIN reason you went on (/are planning) a 4WD trip to the desert? (tick one only)
- *To explore the outback or desert areas* ☐
- *To get to places for other activities such as bushwalking or birdwatching* ☐
- *For the challenge and adventure of engaging 4WD* ☐

Q13 When you go on holidays, how often do you go to desert areas of Australia (tick one only)
- *Always* ☐
- *Sometimes* ☐
- *Not very often* ☐

Planning and safety for the desert part of your trip

Q14 Which of these describes where you took (/ plan to take) your 4WD vehicle in the desert? (multiple ok)
- *Along a particular track (eg the Tanami track)* ☐
- *Only in around towns and cities* ☐
- *On short trips out of towns and cities* ☐
- *Directly from one town or city to another* ☐

Q15 Did you plan to do 4WDing before you left home?
- *Yes* ☐
- *No* ☐

Q16 Have you or anyone who will be travelling in your 4WD vehicle done a 4WD safety training course?
- *Yes* ☐
- *No* ☐

Q17 Did you (/will you) obtain any 4WD or travel safety information before going on your trip?
- *Yes (go to Q19)* ☐
- *No (go to Q20)* ☐

Q18 What were all the sources of travel safety information you obtained or used? (tick all relevant sources)
- *Brochure* ☐
- *Travel book or magazine* ☐
- *Television program* ☐
- *Website* ☐
- *Travel agent* ☐
- *Rental company* ☐
- *Word of mouth* ☐

Q19 Did you (will you) obtained any permits for your trip?
- *Yes* ☐
- *No* ☐

Activities on the desert part of your trip

Q20 Which of these did you do or plan to do on the desert part of your trip? (tick one box for each item)

	Did/ planning to do	*Might do*	*Did not/ will not do*
Engage 4WD off road	☐	☐	☐
Challenging 4WD tracks	☐	☐	☐
A Tag-along 4WD tour	☐	☐	☐
A guided 4WD operator tour	☐	☐	☐
Other guided tour	☐	☐	☐
Bushwalking along a trail	☐	☐	☐
Nature-based activities (e.g. birdwatching)	☐	☐	☐
A Bush tucker tour	☐	☐	☐
A guided tour on Aboriginal land	☐	☐	☐
Purchase authentic Aboriginal arts/ craft or cultural items	☐	☐	☐
Attend a performance of Aboriginal theatre/ music or dance	☐	☐	☐
Purchase souvenirs	☐	☐	☐
Visit a working station (e.g. camel/ cattle)	☐	☐	☐

THE END - Thank you for completing this survey.

Long form survey instrument

A more substantial survey instrument was designed to collect information about travel behaviour, trip planning (information sources, extent to which itineraries are flexible etc.), travel motivations, travel history and preferences for different types of experiences. This instrument provided a detailed snapshot of a set of 4WD travellers and could be used to monitor changes in market behaviour over time, including responses to new products, destinations and marketing strategies. In Stage 1 it was implemented using a sample of 4WD recreation club members across Australia.

Four wheel drive clubs represent the interests of recreational four wheel drivers. Clubs in three states cooperated to conduct an in-depth survey of their members. A tiered structure of 4WD clubs exists in Australia with The Australian National Four Wheel Drive Council (ANFWDC) representing clubs at the national level (see http://www.anfwdc.asn.au/). All states and territories have a peak body to which local clubs are affiliated (Figure 11). The makeup of local clubs is generally based on a type of vehicle or location. However, there is a recent trend towards basing clubs on demographics (for example, women's clubs).

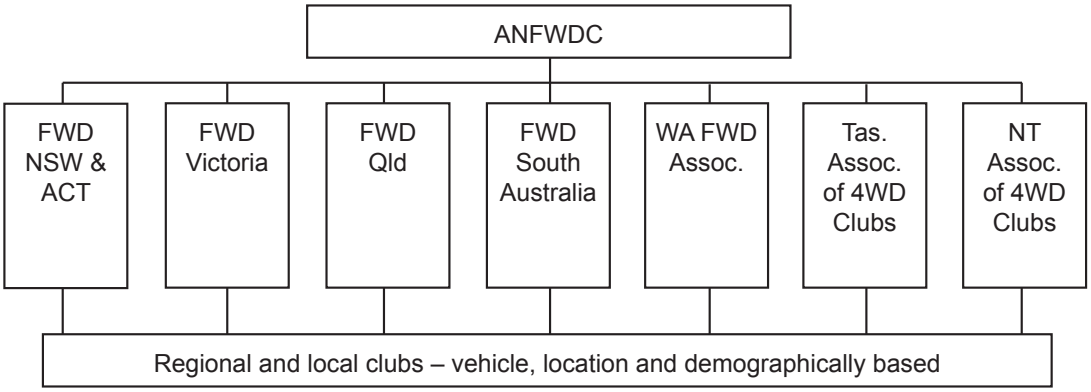


Figure 11: The structure of recreational 4WD club networks in Australia.

Vehicle-specific clubs are formed for owners of vehicles of a specific manufacture or model such as the Toyota Land Cruiser Club of Western Australia or the Subaru Club of South Australia. Location-based clubs can include state arms of national clubs (such as the Wanderers Four Wheel Drive Club of South Australia) or region-specific clubs such as the Mount Lofty Ranges Club in South Australia.

Most clubs maintain websites and an audit of these sites found that in all states clubs perform similar roles and functions including:

- lobbying for maintenance of access to tracks and land for recreational 4WD driving
- promoting and supporting conservation and sustainable driving practices
- providing format driver training courses
- providing other educational programs and courses
- providing a structure around which social gatherings of people with similar interests can take place including regular organised trips.

From a research perspective, clubs and their members were considered to be groups of interest because they are organised around a common interest in four wheel driving as a recreational activity. The focus groups revealed that club members consider themselves to be the custodians of expertise on recreational 4WD driving. Many of the regular trips organised by clubs are to desert regions. On Track researchers at James Cook University developed a mail-out survey (available in the On Track folders) for club members which aimed to obtain data about:

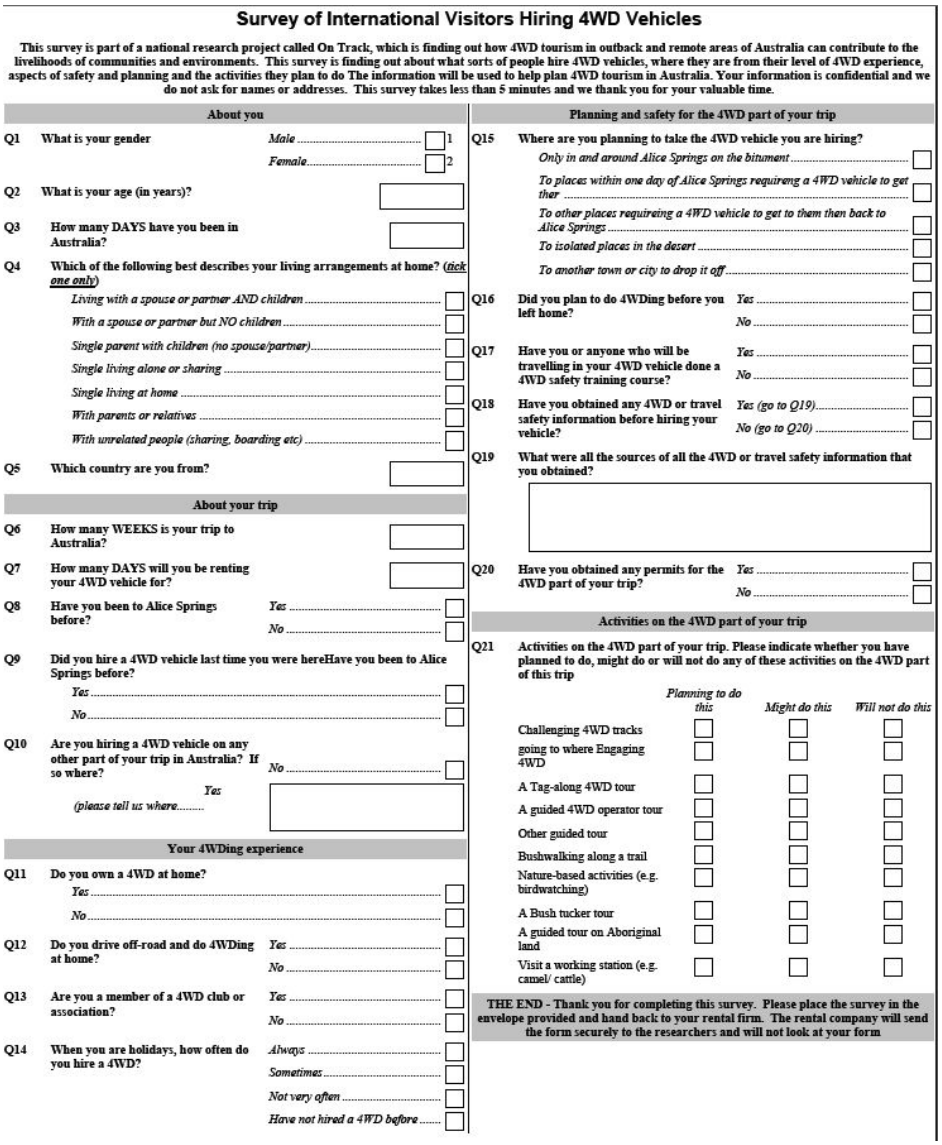
- demographics
- 4WD experiences

- motivations for 4WD trips
- activities preferred on trips
- trip planning
- improvements they perceived were needed.

The survey was distributed to 12 of the 80 clubs registered in Victoria. Official position holders (for example, treasurers) distributed the survey to individual members. Almost 200 completed responses were returned by this method. A much lower number of responses were received from South Australian and Western Australian clubs: 16 surveys altogether. It is difficult to accurately calculate the response rate for this survey since data on club members in each state and territory is held in confidence.

International hire car travellers survey

This questionnaire was developed in consultation with the manager of the Britz office in Broome and the sales and marketing manager for Britz nationally (H06003 ethics approval variation). Its primary purpose was to address gaps in information about the international traveller market. A German and English version was developed. Researchers visited the Broome office and briefed the local manager about the purpose of the project and the application of the survey instrument. Insufficient numbers of surveys have been returned to allow an analysis of the results and the survey is still in the field at the time of writing. A copy of the instrument is provided below.



Survey of International Visitors Hiring 4WD Vehicles

This survey is part of a national research project called On Track, which is finding out how 4WD tourism in outback and remote areas of Australia can contribute to the livelihoods of communities and environments. This survey is finding out about what sorts of people hire 4WD vehicles, where they are from their level of 4WD experience, aspects of safety and planning and the activities they plan to do The information will be used to help plan 4WD tourism in Australia. Your information is confidential and we do not ask for names or addresses. This survey takes less than 5 minutes and we thank you for your valuable time.

About you

Q1 What is your gender — Male ☐ 1 — Female ☐ 2

Q2 What is your age (in years)? ☐

Q3 How many DAYS have you been in Australia? ☐

Q4 Which of the following best describes your living arrangements at home? (tick one only)

- Living with a spouse or partner AND children ☐
- With a spouse or partner but NO children ☐
- Single parent with children (no spouse/partner) ☐
- Single living alone or sharing ☐
- Single living at home ☐
- With parents or relatives ☐
- With unrelated people (sharing, boarding etc) ☐

Q5 Which country are you from? ☐

About your trip

Q6 How many WEEKS is your trip to Australia? ☐

Q7 How many DAYS will you be renting your 4WD vehicle for? ☐

Q8 Have you been to Alice Springs before? — Yes ☐ — No ☐

Q9 Did you hire a 4WD vehicle last time you were hereHave you been to Alice Springs before?

- Yes ☐
- No ☐

Q10 Are you hiring a 4WD vehicle on any other part of your trip in Australia? If so where? — No ☐ — Yes (please tell us where..... ☐

Your 4WDing experience

Q11 Do you own a 4WD at home?

- Yes ☐
- No ☐

Q12 Do you drive off-road and do 4WDing at home? — Yes ☐ — No ☐

Q13 Are you a member of a 4WD club or association? — Yes ☐ — No ☐

Q14 When you are holidays, how often do you hire a 4WD?

- Always ☐
- Sometimes ☐
- Not very often ☐
- Have not hired a 4WD before ☐

Planning and safety for the 4WD part of your trip

Q15 Where are you planning to take the 4WD vehicle you are hiring?

- Only in and around Alice Springs on the bitument ☐
- To places within one day of Alice Springs requireng a 4WD vehicle to get ther ☐
- To other places requireing a 4WD vehicle to get to them then back to Alice Springs ☐
- To isolated places in the desert ☐
- To another town or city to drop it off ☐

Q16 Did you plan to do 4WDing before you left home? — Yes ☐ — No ☐

Q17 Have you or anyone who will be travelling in your 4WD vehicle done a 4WD safety training course? — Yes ☐ — No ☐

Q18 Have you obtained any 4WD or travel safety information before hiring your vehicle? — Yes (go to Q19) ☐ — No (go to Q20) ☐

Q19 What were all the sources of all the 4WD or travel safety information that you obtained? ☐

Q20 Have you obtained any permits for the 4WD part of your trip? — Yes ☐ — No ☐

Activities on the 4WD part of your trip

Q21 Activities on the 4WD part of your trip. Please indicate whether you have planned to do, might do or will not do any of these activities on the 4WD part of this trip

	Planning to do this	Might do this	Will not do this
Challenging 4WD tracks going to where Engaging 4WD	☐	☐	☐
A Tag-along 4WD tour	☐	☐	☐
A guided 4WD operator tour	☐	☐	☐
Other guided tour	☐	☐	☐
Bushwalking along a trail	☐	☐	☐
Nature-based activities (e.g. birdwatching)	☐	☐	☐
A Bush tucker tour	☐	☐	☐
A guided tour on Aboriginal land	☐	☐	☐
Visit a working station (e.g. camel/ cattle)	☐	☐	☐

THE END - Thank you for completing this survey. Please place the survey in the envelope provided and hand back to your rental firm. The rental company will send the form securely to the researchers and will not look at your form

In-depth interviews (4WD travellers in the desert)

Thirty interviews were conducted in and around Alice Springs with both domestic (15) and international (15) travellers. They focused on attitudes towards Aboriginal cultural tourism products and the consumption patterns of those products. The interviews aimed to establish whether product design or methods of product distribution could be improved. Nothing was known about the demand from the desert 4WD market for Aboriginal tourism products and the potential for Aboriginal desert people to develop viable products to meet market needs. A visiting researcher from IMC-Krems in Austria, Doris Schmallegger, undertook a masters-level-equivalent research project (in affiliation with On Track) to identify whether 4WD travellers in central Australia were receptive to Aboriginal tourism products and whether current marketing and distribution methods of Aboriginal tourism products were appropriate for this market.

Semi-structured interviews were employed by this research project. An interview guideline was developed, including a checklist of general open-ended questions and related probing questions to structure and deepen the conversation. The interviews started with several introductory 'warm up' questions to make the participants feel comfortable and to sequence to the main questions relating to the research. This approach has been recognised by many researchers as a useful means of setting the right context for an interview (Jennings 2001:165). Although not specifically related to the study's research problems, these introductory questions also generated a large amount of additional data which contribute to a better understanding of 4WD desert travellers' motivations and trip patterns and could therefore be included in the data analysis.

The interview guideline is described in Table 12 below.

Table 12: Topics in the interview guideline and their relation to research objectives

General topics addressed	Relationship to research objectives
Trip motivations and characteristics, general trip patterns and preferences	This section contained a set of introductory questions. It examined motivations for desert travel and for selecting central Australia as a destination, reasons for using 4WD vehicles and preferences for exploring remote destinations.
Trip itinerary	This section determined which places and regions were included in the itinerary and whether specific activities were sought on their trip. It also included questions to identify the best and worst experiences encountered during the trip and give reasons for these choices.
Trip planning	This section established whether and when elements of the trip were planned. What are the circumstances under which 4WD travellers decide on specific trip elements?
Information search behaviour	This topic examined the sources and types of information that 4WD travellers look for and how these were applied.
Demand for Aboriginal tourism products	This section looked at general interest in Aboriginal tourism products. It investigated which activities have been undertaken and which activities they are still interested in doing. It also explored the relative importance of Aboriginal culture in the product mix of the region and identified potential barriers to engagement in Aboriginal tourism activities.
Current distribution methods for Aboriginal tourism products	The last part of the interview was used to explain the purpose of the study to participants and asks for their personal opinions about current information and distribution methods for Aboriginal tourism products in central Australia and what they would suggest to improve them.

The study used a purposive sampling method, which has often been recognised as appropriate for conducting qualitative small-scale, in-depth studies (Ritchie & Lewis 2003:78). Purposive sampling, also referred to as judgement sampling, seeks information-rich cases which can be studied in-depth without the requirement for a statistically-derived sample size. Instead, the focus is on selecting respondents with characteristics that will enable the researcher to generate new theories through investigating the ideas, insights and opinions of those who can offer some perspective on the research question (Churchill & Iacobucci 2005:327). The sampling strategy for this study incorporated a crude

stratification method based on travel party type; it divided the sample into meaningful sub-groups in order to capture the major characteristics and variations between each sub-group and facilitate comparisons.

Semi-structured qualitative interviews were conducted in September 2006 with 4WD travellers at three different locations in central Australia (Figure 12): Alice Springs, Kings Creek Station near Kings Canyon and Glen Helen Resort in the West MacDonnell Ranges. The two latter locations offer remote accommodation on the 4WD route known as the 'Mereenie Loop'. Travellers were approached on-site to see if they would participate in interviews. All three interview sites represent popular points of convergence for 4WD travellers in central Australia and therefore were chosen as strategic interview locations to facilitate access to a meaningful sample.

Figure 12: Interview locations in central Australia

Source: adapted from Tourism NT 2007

Potential interview participants were approached at these sites and the interviewer introduced herself and the project. Informed consent was obtained by explaining the project and seeking permission to interview, either individually or as a travel party. Prior to each interview, the purpose of the study was explained and participants received a written project description, including an outline of their rights in relation to privacy and confidentiality. Furthermore, each participant was required to sign a letter of consent.

A filter question was asked about whether the main purpose of the trip was for leisure and whether a 4WD vehicle was the main form of transport. The study yielded a total sample of thirty 4WD travel parties comprised of 16 domestic and 14 international travel parties.

Table 13: Origin of interview participants in relation to interview location

Interview location	Domestic	International
Alice Springs	10	3
Kings Creek Station	6	5
Glen Helen Resort	0	6
Total	16	14

Most international respondents originated from continental Europe; Germany is most represented (7), followed by Switzerland (3), and France, Holland and Denmark (1 each). One participant was from Canada. Although there was a strong representation of German participants this outcome is not unexpected and may not constitute significant bias since Germany is an important source market for 4WD travellers to remote areas. The Northern Territory Travel Monitor (Northern Territory Tourism Commission 2004) conducted on behalf of Tourism NT from 1997 to 2004 suggests that visitors from Germany and other parts of Europe are relatively over-represented amongst international 4WD travellers, even though they are ranked behind the cluster of the UK, Ireland and Scandinavia in terms of absolute visitor numbers.

The majority of Australian interview participants were from Victoria (13), mainly because the interview timeframe coincided with the school holidays in this state. The three remaining domestic travel parties were from Queensland, New South Wales and Western Australia. While the strong representation of Victorian 4WD travellers may have induced bias, Taylor and Prideaux (2006) have established that the motivations of 4WD travellers for trips to remote areas vary little across states and territories. In terms of travel parties, the domestic sample was predominantly families and couples, while the international sample had more couple-only parties.

Table 14: Travel party type for participants

Travel party type	Domestic	International
Families with children	9	4
Couples/families travelling with friends in a group	4	1
Couples without children (>40 years)	3	4
Couples without children (<40 years)	-	5
Total	16	14

The interviewer was fluent in both English and German, which allowed interviews with the international travel parties from Germany and Switzerland to be conducted in German, while the remaining interviews were conducted in English. Interviews typically lasted between 20 and 45 minutes and were audio-taped with the approval of participants. Since all participants agreed to their interviews being audio-taped, notes were not taken during the interviews. After completing the interviews, recordings were transcribed into the form of summary statements and verbatim quotes. For the purpose of uniformity and in order to facilitate the use of the transcribed data for future research projects at the hosting institution, Charles Darwin University, interviews conducted in German were translated into English by the researcher.

An ‘open coding’ approach was adopted to categorise responses; that is, identifying the main themes and common patterns from the raw data and grouping them into meaningful conceptual categories to get more manageable data units (Hoepfl 1997:54–55). These categories were gradually modified, extended or replaced as the analysing process proceeded. Through continuous re-examination of categories it was possible to further identify how the various categories were interlinked and how potential connections could be established. This process is also referred to as ‘axial coding’; it helps the researcher to build

a big picture and a holistic understanding of the problem under investigation (ibid. 55–56). Veal (2006) argues that the essence of any analysis procedure must be to return to the research problems and questions and begin to sort and evaluate the information gathered in relation to the questions posed and the concepts identified. In line with this concept, a 'coding tree' was developed, which outlines all identified categories and subcategories in relation to the research questions and forms a framework against which the collected data was analysed.

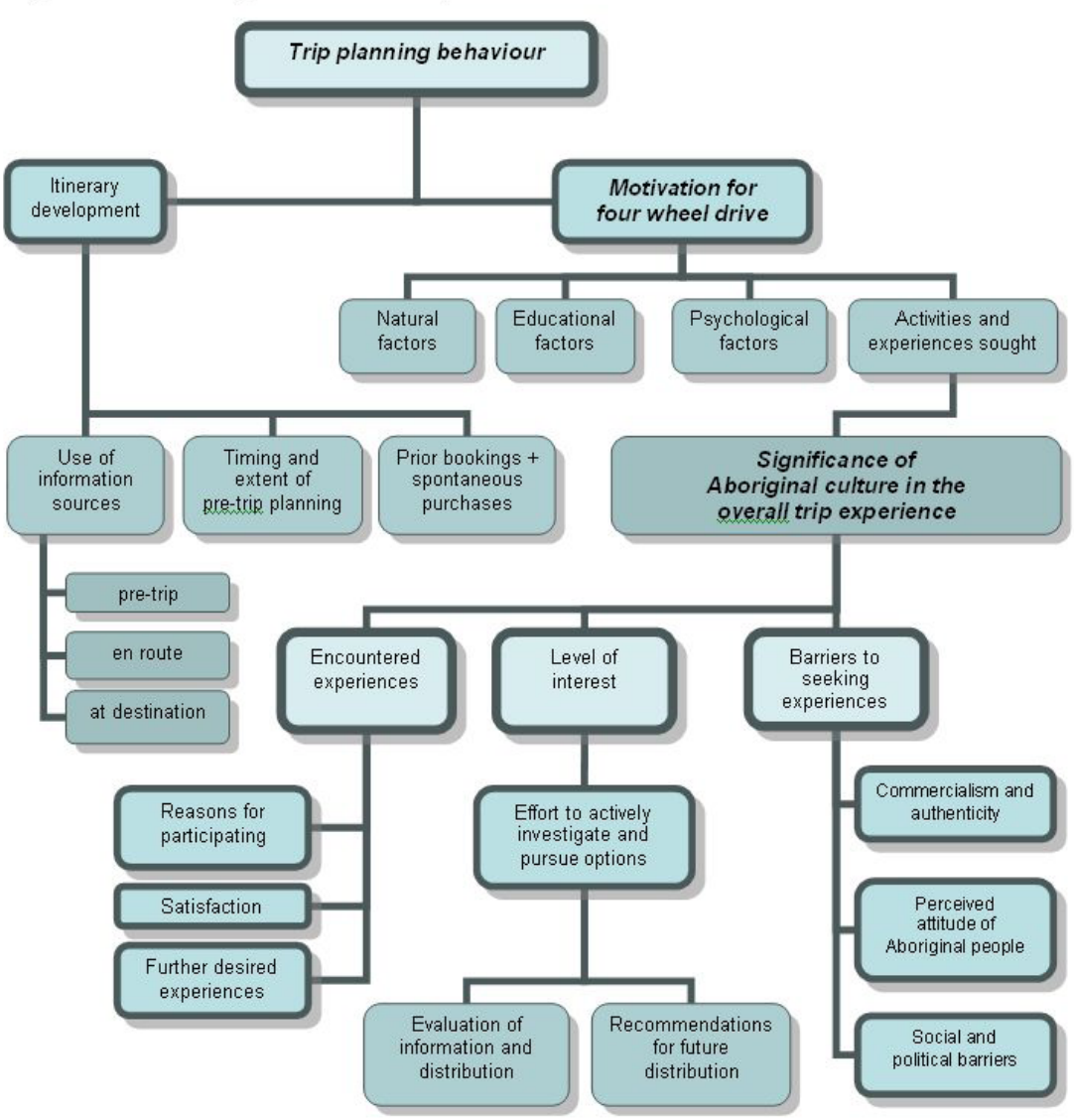


Figure 13: Coding tree for in-depth interviews

In-depth interviews (experienced 4WD travellers)

In-depth interviews were also conducted with 'deep desert' travellers; these are travellers with an extensive experience of undertaking 4WD trips in the Australian desert and a commitment to continue taking these trips on a regular basis. These interviews sought to identify the values attached to desert travel and the attributes of an 'ideal' desert 4WD experience. The interview technique can be replicated with other groups of desert travellers and some interviews have already commenced with novice travellers (defined as travellers on their first desert 4WD trip).

Travel literature provides large-scale data about tourists' experience of, motivation for and thoughts about their holidays, but it provides limited space or opportunity for tourists' voices to filter through. It does not present tourists' own expressions of 'their views and interpretations of people, places, the

tourist role, their own motivations and their reactions to travelling' (Pearce 1982:123). Hearing the voice of the tourist is an important strategy to help develop sustainable 4WD tourism practices and policies. This kind of information will support the intelligent and creative development of tourism experiences that protect tourists' experiences and ensure that their impacts on local communities and environments is positive, or at least, neutral.

An important method for understanding tourist behaviour is the etic-emic method (Triandis 1972). The emic strategy is concerned with the perspective of the participant or the tourist, and explores how he or she views the world, how they view the other and what forces shape their point of view. Tourists themselves provide excellent accounts of their own motivations. This assists the development of an appreciation of the value of the socially constructed world of the tourist, which may be distinct from the observer's views. In contrast, the etic approach relies purely on the researcher's observations and conclusions about tourist behaviour.

The emic approach guided the data collection for this research. A diverse range of tourists' voices was actively sought and analysed. An interview schedule was used to carry out the interviews with approval from Murdoch University's Human Research Ethics Committee (2006/300). In practice the structure and content of the interviews was very flexible: the 4WD travellers were allowed to recount their experiences, understandings and expectations from the 'starting point' that they perceived was important. These travellers spoke entirely from their own background, though the questions addressed to them were broadly the same. However, during the course of the interviews, they were often asked specific questions or to elaborate on themes they had chosen to bring up during the interviews. These were issues that they thought were pertinent to a broad understanding of sustainable 4WD tourism.

The 4WD tourists interviewed were initially chosen though word-of-mouth contacts. These participants then referred the researchers on to others, creating a snowballing sample. At the point of saturation, when fairly similar responses were being received, we concluded this first stage of interviewing. However, we have concentrated only on 4WD tourists who are repeat visitors; people who have visited the desert with a frequency that gives them special insight (Murdoch University Ethics permit number 2006/300).

Although interviews were conducted between December 2006 and January 2007, at a time when activities slow down for the holiday season, we found that the interviewees were cooperative, friendly and very generous with their time. They seemed eager to share their experiences of a vocation that was clearly extremely close to their hearts. In addition, many of them also provided us with invaluable insights through the hours of recorded videos of their trips, travel diaries and photographs they shared to give us a more realistic sense of their accounts. This allowed us to picture a 'travel career' for the participants, which, although not been described for reasons of space, nevertheless was vital in describing the multifarious aspects to travel. Note that all respondents were highly experienced desert 4WD travellers. This criterion was central to this specific aspect of the wider research project.

Tales from the Track

On Track invited desert 4WD travellers to write short stories (1000 words) describing their most memorable desert 4WD trip. Respondents were able to construct the stories in any way they chose, with the only parameters being the length of the story and that it must encapsulate what made the trip memorable for them. This method of data collection allowed a range of factors that contribute to 'ideal' desert 4WD trips to be identified. A similar approach might be used with more targeted market segments and the technique could be adapted to storyboarding either in the context of a focus group (where a collective story is described) or in individual interviews.

DESERT KNOWLEDGE CRC

"On Track" Four Wheel Drive Tourism

Desert Knowledge Cooperative Research Centre

Tales from the Track
WIN A TRIP TO ALICE SPRINGS

A Competition Capturing the Essence of your Desert 4WD Trips
Great Prizes on Offer for your stories!

Tales from the Track asks you to write about the essence of your ideal desert track experience; whether it be alone, in a group, camping rough, getting bogged, meeting people, giving a helping hand or simply enjoying a quiet time. It could be about the departure, about the journey, a destination, arriving or getting home again. It could be about adventure or risk, about cultural exchange or the people of the desert. It could be about planning and preparation, a sense of accomplishment in getting there and back, of being independent or being self-reliant. It could be about the heat, the cold, the wet, the mud, the sand or the flies. It could be about the adventures of children as they travel and it could be about your family together. It could be a cooperative effort to restore a well or to build a dunny. It's up to you!

The best entries will be published (with the author's permission) and prizes include a trip to Alice Springs including flights from any capital city and accommodation. At the Symposium (see http://www.desertknowledge.com.au/symposium for more information) you will get to share your story by reading it out to the delegates. Other great prizes the **Great Desert Tracks map pack** and **Great desert Tracks CD Rom,** from HEMA Maps valued at $158 as well as cash and product prizes donated by 4WD Victoria and their supporters. Competition details are given below so get to work and tell us your *Tales from the Track!*

Competition Details

1. Competition runs from 1 May 2006 and closes on 15 September 2006.
2. Entry forms are available from the On Track website at http://www.desertknowledge.com.au/crc/ontrack and must be submitted with entries.
3. Entries will be judged by members of the *On Track* Steering Committee, a journalist and 4WD experts.
4. Entries must consist of 1000 words or less and may include a small number of images or drawings (4 maximum). Entries must be emailed to talesfromthetrack@cdu.edu.au and be received by 5pm Central Standard Time on the closing date.
5. Entries may be jointly authored.
6. For more information write to the email address above or contact Andrew Taylor (08) 8946 6536.

Tales from the Track is a unique competition run as part of the *On Track* research project - a Desert Knowledge Cooperative Research Centre project concerned with weighing up the potential economic and social benefits of 4WD tourism against the pressures on the desert environment, communities and infrastructure. See our website for more information at http://www.desertknowledge.com.au/crc/ontrack

PO Box 2111, Alice Springs, NT 0871, Australia
Phone: 08 8950 7162 Fax: 08 8950 7187 www.desertknowledge.com.au/crc

CRC

The competition ran from May to August 2006 and was advertised in 4WD club newsletters, through media outlets using a media release and subsequent radio interviews and in popular national 4WD magazines (see advertisement below). Prizes were donated by DKCRC (a trip to Alice Springs to attend the Desert Knowledge Symposium), FWDV (an assortment of 4WD communications and safety equipment valued at $1500) and Hema Maps (Great desert tracks map pack and Great desert tracks CD Rom, valued at $158). Ethics approval for the conduct of this data collection was given by the Charles Darwin University Human Research Ethics Committee (H06003).

Around 25 entries were received. Their format ranged from diarised accounts of individual trips to narrative expressions of desert experiences gained over a number of trips. Entries were judged against a range of criteria by a panel of three judges who were associated with the project, including a journalist, an academic and the On Track research fellow. The winning entry was 'A desert peace' by Jo Connaughton from Perth. Her story described two days of her family's trip along the Canning Stock Route. Jo presented her story at the Desert Knowledge Symposium in Alice Springs in 2006.

Analysis of travel stories from additional sources

Four wheel drive travellers have additional mechanisms through which they tell stories of their desert travels, including blogs, club publications (such as newsletters and web sites), 4WD and special interest magazines and other published material. These accounts can provide insights into how these experiences are constructed. The project developed a set of templates for analysing this sort of material against the research themes. In some cases, participants provided documentation of their experiences of 4WD travelling (such as visitor books, records of vehicle accidents and photographs). A substantial amount of this literature was accessed for the responsible travel and market insights themes and additional work is being done (part of a PhD) focusing on analysing photographs posted on blog sites.

Ethics approval for the conduct of this survey was given by the Charles Darwin University Human Research Ethics Committee (H060006).

Methods used by the innovation and capacity theme

This research theme concentrates on documenting the factors that affect the capacity of desert tourism systems to innovate. An analysis of the structure and composition of the existing industry was undertaken. This included research into the current product mix and the extent of collaboration between desert businesses and organisations. Research for this theme examined current and past consumption patterns to postulate the extent to which the market might be receptive to a range of desert 'experiences' that could be offered by new products and services. Importantly, the research attempted to gauge whether new products and different distribution systems might encourage 4WD travel in the desert.

The research in this area was framed using systems of innovation (SOI) theory. SOI literature about tourism describes destinations as operating within complex systems. It lays out the pre-conditions for innovation in such systems. The more successful and innovative SOIs are characterised by managed and purposeful change and place a high value on knowledge about markets, competitors and the performance of the system itself.

Within this framework, the research described and assessed a number of attributes of desert economies. These are listed in Table 15; the associated methodologies are described in the corresponding rows.

Table 15: Sources and methods for innovation constraints and opportunities

Innovation constraint/opportunity	Methods	Datasets and information sources
The industrial composition of desert economies and how this may have changed over time	Secondary dataset analysis	SENSIS database of types and numbers businesses operating in desert locations over time
The existing range of products and services being made available to the market (with particular emphasis on describing the types, range and their level of diversity)	Meta-analysis of visitor experiences offered in brochures and online	Product information brochures online and in hard copy
Capacity of industry to provide a diverse range of products and services in response to market requirements and in light of external influences on the system	Classification of existing product offerings Case study – Gunbarrel Highway	Tour brochures accessed online and from other sources Internet resources about products and organisations serving the Highway
The potential for new markets to be identified and accessed by desert destinations	Case Study – Gunbarrel Highway	Content analysis of types and levels of cooperation and collaboration around the Highway
The influence of policy and development initiatives on visitor numbers and markets	Case study – Red Centre Way	Northern Territory Government project documents Tourism NT strategic plans and annual reports
Changes in transport systems and modes over time and the impact of these on innovation	Analysis of secondary datasets	Commonwealth Department of Transport and Regional Services – AVSTATS Northern Territory Department of Planning and Infrastructure – road traffic count data
The effectiveness of product distribution systems in desert areas	Internet-mediated research on distribution systems for tours	Content analysis of tour operator website booking and purchasing facilities
The ability of the market to obtain and access relevant and up to date information on the products and experiences it seeks as well as information relating to safe and responsible travel	Product information audit	Existing product information for central Australia sourced online, via visitor information centres, through the information directories, state tourism organisations and local tourism organisations

Two case studies were undertaken to determine if there is a discernable link between the innovation constraints and opportunities identified in secondary data and policy, and the complex mix of initiatives and developments in desert Australia that relate to the broader tourism system. The Red Centre Way case study maps out a range of scenarios which might occur as a result of the sealing of the non-bituminised sections of several roads in and around the Mereenie Loop in central Australia. Scenarios

were derived from existing secondary data on the current status of visitor activity and the economic organisation in the region using a mixed methods approach. The Gunbarrel Highway case study is a content analysis undertaken to assess the economic development around the Highway based on existing collaborations between businesses and other organisations.

Red Centre Way case study

The Red Centre Way initiative involves the development of a touring route linking Alice Springs in the east to Uluru-Kata Tjuta in the west that offers an alternative to the main (Lasseter) highway. The current network of roads is known as the Mereenie Loop; it includes an 'inner loop' connecting Alice Springs with Hermannsburg and Glen Helen and an 'outer loop' which continues through Hermannsburg and across the escarpment to Watarrka National Park before joining the Lasseter Highway 130 kilometres east of Uluru-Kata Tjuta National Park. The Northern Territory Government is sealing the major roads which will form the Red Centre Way. The existing inner loop is expected to be sealed in 2016, with the outer loop to follow.

To assess the likely impacts of this initiative on the central Australian tourism system, the research aims to inform stakeholders about the need to understand the existing visitor flows linked to the Mereenie Loop and to assess the extent to which various flow patterns may emerge. It proposes that a change from an unsealed road network with a reputation as a 4WD trip to a more formalised touring route for all vehicles might affect markets and have flow on effects for the development of tourism in the region. Three broad methodological processes were followed:

- a review of the literature about touring routes focusing on the systemic factors which are likely to ensure the success of the initiative
- analysis of a range of secondary datasets about visitor markets, businesses and transport networks in the region
- a commercial product audit of businesses and tourist experiences in and around the Red Centre Way.

The analysis aims to provide a description of the probable impact of different scenarios, including the program of road sealing, on the wider tourism system.

Gunbarrel Highway case study

The Gunbarrel Highway crosses the Northern Territory/Western Australia border. Three local governments have jurisdiction over parts of the track as well as two Aboriginal Land Councils and Parks Australia. Its history and characteristics provide reason to expect a level of local engagement in the development of tourism along this track. A level of basic infrastructure exists (particularly at Wiluna and Yulara) that could facilitate development.

The IMR involved three integrated search strategies. Firstly, the search term the Gunbarrel Highway Australia was entered into www.google.com.au. The returned content was scanned and manually filtered to ensure that the URLs in fact related to the 4WD track (for example, the band Midnight Oil has a song called Gunbarrel Highway) and until significant repetition of found websites indicated a satisfactory coverage of the target population. Each of the significant (primary) URLs was searched to identify:

- the name of the organisation linked to the Gunbarrel Highway and its primary business (for example, travel agent, 4WD magazine, book seller, vehicle hire, grocery sales or shire council)
- the proximity of the organisation to the track, using Knoben & Oerleman's (2006) 'geographic' dimension as a basis. Those located on the track, or very close to it, are deemed to be in 'close geographic proximity'. The second classification is 'desert Australia' which includes desert locations not very close to the track, such as the town of Alice Springs (450 kilometres from the eastern end of the track). The third and forth categories are 'other (non-desert) Australia' and 'international'.

- the type of organisation. Organisation types includes those with tourism as their core business, those with some tourism component mixed with other interests: tourism intermediaries, tour operators, tourism marketing agencies, consumer groups, volunteer groups, resident populations, government administrations and resource managers.

The research looked for evidence of collaboration as evidenced by the existence of links or references to other organisations on the websites. The strength of these relationships was assessed by considering their apparent formality, intimacy, the level of activity and reciprocity. The strength of collaborations is classed as strong, moderate, weak or non-existent.

The second phase of the IMR involved a process referred to by Taylor (2005) as 'snowballing'. This allows the identification of additional resources 'by "following" the URLs which are provided on the pages which have just been accessed' (Taylor 2005:90). These secondary and tertiary links identified additional organisations and the data coding process was repeated. This process was continued until no new organisations were identified.

Finally, 13 additional Google searches were conducted using the names of towns, settlements and points of interest listed on a detailed 4WD map of the Gunbarrel Highway produced by Hema Maps (2006); examples include Wiluna, Warburton, Docker River, Lasseter's Cave and Yulara. The snowballing technique employed in the second phase, above, was adopted to identify additional secondary and tertiary links. The process of data coding was repeated.

Interviews with tourism operators and managers

Semi-structured interviews were held with a range of tourism operators and management organisations to develop an understanding of the desert tourism tapestry. In particular, interviews were conducted in situ with stakeholders to enhance the researcher's knowledge of the complex desert tourism system. This aspect of the research was very useful because it also identified gaps in existing knowledge. The types of people who wanted to be part of the research included owners of caravan parks, camel farm managers, resort managers, land management agencies, Aboriginal tour operators, 4WD tour operators, Aboriginal tourism businesses, booking agencies, wholesale distributors, car rental organisations, Aboriginal communities, academics from a variety of fields, 4WD magazine editors, (traditional) Aboriginal land owners, roadhouse managers, Aboriginal arts and crafts retailers, hotel/pub managers, police, park rangers, regional development authorities, state automobile and caravanning/camping associations and a range of people from state tourism organisations.

Review of policy documents and grey literature

The content of policy documents sourced from a variety of 'actors' in the desert tourism system were analysed. Content analysis of grey literature such as annual reports, media releases, travel guides and international literature on 4WD tourism also fed into this theme.

Analysis of secondary data sources

Most of the secondary data sets used by the market analysis theme were also used by the innovation and capacity research theme. Specifically, the aviation statistics from the Bureau of Transport and Regional Economics (BTRE 2006) and road traffic counter data (supplied by Northern Territory Department of Planning and Infrastructure) fed into an analysis of current transport systems and modes over time. Analysis of the type and number of tourism and tourism-related businesses listed in desert areas was undertaken using a time-series iteration of the Sensis Yellow Pages business listing dataset.

Methods used by the responsible travel theme

Analysis of secondary data sources

The secondary data sources used in this research theme include sales of new motor vehicles (ABS), fuel consumption data provided by the BTRE, road crash data and rates (ATSB) and 4WD vehicles crash involvement patterns (RACV).

Long form survey instrument (4WD owners)

A long form survey instrument asked respondents to state whether they agreed or disagreed with a series of statements about safety and responsible travel relation to their 4WD experiences:

Q21. Please indicate if you agree with the following statements in relation to your 4WD experiences.

	Agree	*Disagree*	*Don't know*
Desert trips are usually undertaken by older generations who have more time and money	O	O	O
Current advertising of 4WDs creates unrealistic and unsafe expectations	O	O	O
I often have to stop to assist inexperienced 4WDrivers in rented cars	O	O	O
More women would be interested in 4WDriving if better facilities existed	O	O	O
Commercial tour drivers need more regulation	O	O	O
It is important to have sustainable driving practices to preserve the environment	O	O	O
Too much development will reduce the quality of our experience	O	O	O
Not enough money is spent on infrastructure	O	O	O
It is important to have comprehensive insurance cover on my vehicle before starting a trip	O	O	O

Respondents were also asked to rank the top five possible improvements from a selection of options, some of which relate to responsible travel:

PART D: Improving your 4WD/Off Road Experiences

Q18. Please select from the following the top 5 possible improvements to your 4WD experiences, and rank them on a 1 to 5 basis (with 1 being the most important)

_____ More education for inexperienced drivers
_____ More centralized and accessible information on road closures and permits
_____ Better signage on the roads
_____ Greater access to areas/routes within Australia
_____ More facilities, eg. toilets, water supply points, waste disposal and camping areas along routes
_____ Increased support from rescue services, rangers, etc in remote areas
_____ More responsible media portrayal of 4WD activities and experiences
_____ More information on local and cultural attractions

International hire car travellers survey

International 4WD travellers have a high media profile as a result of their involvement in accidents that result in several fatalities in desert areas each year. A high proportion of international travellers on trips to the desert rent their 4WD vehicles. Several issues exist in relation to these travel parties preparedness for safe and responsible travel. These issues are not unique to international 4WD travellers; however, the impacts may be magnified because travellers from the major source markets, the United Kingdom, Scandinavian countries and Germany, usually have not been exposed to messages about safe and responsible travel. This survey aimed to assess traveller preparedness for desert trips in relation to:

- driver familiarity with vehicle capabilities and engineering characteristics
- driver skills in traversing non-bituminised road surfaces
- level of vehicle preparedness and the quality and serviceability of recovery equipment
- awareness of the variability of road conditions, including hazards such as fauna and washouts
- awareness of the distances between service centres and recovery infrastructure
- knowledge of contingency planning and the importance of information exchange for safety
- understanding the supplies and equipment necessary for desert trips
- knowledge of fauna behaviour
- navigation skills, accident avoidance, accident recovery and emergency response procedures
- addressing vehicle breakdowns
- effectively using and maintaining communications equipment
- knowledge of survival skills for desert areas
- understanding the potential impacts of 4WD travel in desert areas.

As described above, the questionnaire was developed in consultation with the manager of the Britz office in Broome and the sales and marketing manager for Britz nationally (H06003 ethics approval variation). German and English versions were developed. Researchers visited the Broome office and briefed the local manager on the purpose of the project and the application of the survey instrument. Sufficient numbers of surveys have not yet been returned to create a suitably sized dataset to analyse the results. The survey is still in the field.

Review of policy documents and grey literature

A comprehensive literature review of resources related to responsible 4WD travel was undertaken at the Curtin University of Technology. The scope of the review was broad. The material can be divided into two groups: vehicle/driver elements and management/legislation. The type of literature reviewed for vehicle/driver elements includes profiles of 4WD vehicle owners, examinations of trends in vehicle sales, vehicle safety audits (including accident and incident data), the environmental footprint of 4WD vehicles on different landscapes and ecosystems and the social impacts of four wheel driving. The review also audited existing management schemes and legislation related to off-road travel including existing regulatory organisations, permit systems, education programs and other initiatives aimed primarily at 4WD owners. The review used mixed methods to source information including electronic sources such as Proquest, Jestor and Worldcat, specialty 4WD books and magazines and internet mediated research. Relevant state and territory legislation was sourced through government agency websites.

Analysis of travel stories from additional sources

As noted above, 4WD travellers have additional mechanisms through which they tell stories about their desert travels, including blogs, club publications (such as newsletters and web sites), 4WD and special interest magazines and other published material. These accounts can provide insights into how these experiences are constructed. The project developed a set of templates for analysing this sort of material against the research themes. A substantial amount of this literature was accessed for the responsible travel and market insights themes and additional work is being done (part of a PhD) focusing on analysing photographs posted on blog sites.

Appendix B – List of publications from the On Track project Stage 1, at February 2010

Carson D and Cartan G. 2010. Touring routes: types, successes and failures: an international review. In B. Prideaux and D. Carson. (Eds). *Drive Tourism: Trends and Emerging Markets*. Routledge, Oxford.

Carson D and Taylor A. 2006. *Charge of the Might Brigade*, 2006 Desert Knowledge Symposium and Business Showcase. Alice Springs.

Carson D and Taylor A. 2008. Sustaining four wheel drive tourism in desert Australia: exploring the evidence from a demand perspective. *The Rangeland Journal*, 30(1), 77–83.

Carson D, Prideaux B, Coghlan A and Taylor A. 2009. Heritage as a motivation for four-wheel-drive tourism in desert Australia. *Journal of Heritage Tourism*, 4(3), 217–225.

Cartan G and Carson D. 2009. Local engagement in economic development and industrial collaboration around Australia's Gunbarrel Highway. *Tourism Geographies*, 11(2), 169–186.

Chewings V, Carson D, Box P, Breen J, Taylor A and Friedel M. 2007. Modelling self-drive tourist flows across desert Australia using VRUM™. *Proceedings of the Spatial Science Institute Biennial International Conference* (SSC2007), May 14–18, Hobart, Tasmania.

Coghlan A and Prideaux B. 2008. Matching motivations and activities for 4WD club members and the implications for developing desert 4WD tourism. *CAUTHE 2008 Conference*. February 11–14, Gold Coast, Queensland.

Coghlan A, Prideaux B. 2009. *4WD Desert tourism – an examination of attitudes, motivations and perceptions*. DKCRC Working Paper 43. Desert Knowledge CRC, Alice Springs.

Prideaux B and Coghlan A. 2010. Driving the Desert – Profiling 4Wheel Drive Visitors. In B. Prideaux and D. Carson. (Eds). *Drive Tourism: Trends and Emerging Market*s. Routledge, Oxford.

Jacobsen D. 2009. 'Towards Understanding Domestic Tourists and Implications for Desert Aboriginal People from Domestic Tourists 4WDing in Central Australia'. Charles Darwin University, Darwin. Australia. Unpublished Doctor of Philosophy thesis.

Narayanan Y and Macbeth J. 2009. Deep in the desert: merging the desert and the spiritual through 4WD tourism. *Tourism Geographies*. 11 (3). 369–389.

Schmallegger D. 2007. *Aboriginal Tourism Development in Central Australia: How to reach the four-wheel-drive market*. VDM Verlag, Saarbruecken, Germany.

Schmallegger D. 2010. Managing the transition from coach to car based markets: the search for commercial value in Australia's Flinders Ranges. In B. Prideaux and D. Carson. (Eds). *Drive Tourism: Trends and Emerging Markets*. Routledge, Oxford.

Schmallegger D and Carson D. 2007. Reaching the independent traveller: product distribution issues for Aboriginal tourism enterprises in remote Australia, *3rd International Conference on Tourism*. July 5–8. Athens, Greece.

Schmallegger D and Carson D. 2008. Information Search and Trip Planning Behaviour of International and Domestic Four Wheel Drive Travellers in Central Australia. *CAUTHE 2008 Conference*. February 11–14, Gold Coast, Queensland.

Schmallegger D and Carson D. 2009. Destination Image Projection on Consumer Generated Content Websites: a case study of the Flinders Ranges. *Journal of Information Technology and Tourism*, 11(2). Online publication < http://ojs.modul.ac.at/index.php/jitt/issue/view/34>.

Taylor A and Carson D. 2010. Four Wheel Drive Tourism in Desert Australia – the charge of the 'Might Brigade'?. In B. Prideaux and D. Carson. (Eds). *Drive Tourism: Trends and Emerging Markets*. Routledge, Oxford.

Taylor A and Prideaux B. 2008. Profiling four wheel drive tourism markets for desert Australia. *Journal of Vacation Marketing*. 14 (1). 71–86.

Taylor A and Carson D. 2007. Economic development for remote communities – can 4WD tourism help?, *3rd International Conference on Tourism*. July 5–8. Athens, Greece.

Taylor A and Carson D. 2007. It's all good. Implications of Environment Choice by Domestic 4WD Travellers in Australia, *CAUTHE 2007 Conference*. February 11–14, Sydney, Australia.

Taylor A and Carson D. In press. Four wheel drive tourism and economic development opportunities for remote areas. *Tourismos*.

DKCRC Partners

AIATSIS

Australian Government
Department of Families, Community Services and Indigenous Affairs

ANU
THE AUSTRALIAN NATIONAL UNIVERSITY

Centre for Remote Health

CHARLES DARWIN UNIVERSITY

CSIRO

Curtin
University of Technology

desert peoples centre

Government of South Australia
Department of Water, Land and Biodiversity Conservation

Government of Western Australia

Griffith UNIVERSITY

JCU
JAMES COOK UNIVERSITY

MURDOCH UNIVERSITY
PERTH, WESTERN AUSTRALIA

Northern Territory Government

NEWMONT
The Gold Company

NSW DEPARTMENT OF PRIMARY INDUSTRIES

Southern Cross UNIVERSITY

TANGENTYERE COUNCIL

THE UNIVERSITY OF ADELAIDE
AUSTRALIA

University of South Australia

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

THE UNIVERSITY OF WESTERN AUSTRALIA

University of Wollongong

Waltja Tjutangku Palyapayi
"doing good work with families"