ADVENTURE TOURISM IN THE KWAZULU-NATAL PROVINCE: IDENTIFICATION OF HOTSPOTS AND MOBILE KNOWLEDGE

by

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I declare that “Adventure tourism in the KwaZulu-Natal province: identification of hotspots and mobile knowledge” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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SIGNATURE DATE
(Mr)

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ACKNOWLEDGEMENTS

There have been many inspiring beautiful people who have guided and powered me through this journey. My family, supervisors, friends and colleagues. Over and above this, there is another force that I owe my allegiance to and for that I dedicate this prayer:

“Earth, Teach Me”

"Earth teach me quiet ~ as the *grasses* are still with new light.
Earth teach me suffering ~ as old *stones* suffer with memory.
Earth teach me humility ~ as *blossoms* are humble with beginning.
Earth teach me caring ~ as *mothers* nurture their young.
Earth teach me courage ~ as the *tree* that stands alone.
Earth teach me limitation ~ as the *ant* that crawls on the ground.
Earth teach me freedom ~ as the *eagle* that soars in the sky.
Earth teach me acceptance ~ as the *leaves* that die each fall.
Earth teach me renewal ~ as the *seed* that rises in the spring.
Earth teach me to forget myself ~ as melted *snow* forgets its life.
Earth teach me to remember kindness ~ as dry *fields* weep with rain."

A native Indian-American prayer

SUMMARY

This research focused on adventure tourism in KZN. The adventurer traveller is interested in remote pristine hotspots. A concern is that irresponsible behaviour on the adventurer's part could lead to the destruction of the fragile natural environment, as well as negatively interfere with the local traditional cultural values.

Adventure hotspots were identified by using the functionalities of a GIS. These findings were validated by tourism practitioners in KZN.

The researcher also proposed a practical solution that could improve or enhance the behaviour of adventurers. Existing media were collated into information prompts. These information prompts were categorised in tables that could be linked to a mobile GIS environment.

The researcher then examined the framework requirements for a mobile GIS. This resulted in a set of seven criteria that brought together the core essentials required for the conceptual framework of a mobile GIS device dedicated to the adventurer in KZN.

ABBREVIATIONS AND ACRONYMS

ACE	Adventure, Culture and Ecotourism
AMAFA	Heritage KwaZulu-Natal
apps	applications
ASGISA	Accelerated Shared Growth Initiative for South Africa
ATTA	Adventure Travel and Trade Association
AU	African Union
CAD	computer-aided design
CGM	Consumer Generated Media
DEAT	Department of Environmental Affairs and Tourism
DHA	Department of Home Affairs
DIWI	Digital Dowsing Rod
DT	Department of Tourism
DTI	Department of Trade and Industry
EKZNW	Ezemvelo KZN Wildlife
ENPAT	Environmental Potential Atlas
ESPN	Entertainment and Sports Programming Network
FIFA	Fédération Internationale de Football Association
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
GSDI	Global Spatial Data Infrastructure Association
GSM	Global System for Mobile Communications
HCI	Human Computer Interface
iLBS	interactive Location based Service
IMF	International Monetary Fund
ISM	Information Systems Manager
KZN	KwaZulu-Natal
LAN	local area network
MCE	Multi-criteria Evaluation
NDT	National Department of Tourism
NEPAD	New Partnership for Africa's Development
NSB	Natal Sharks Board
OECD	Organisation for Economic Cooperation and Development
OGDMS	Open Global Destination Marketing System
PGDS	Provincial Growth and Development Strategy
PSDF	Provincial Spatial Development Framework
PTF	Provincial Tourism Forum
QR	Quick Response
SADC	South African Development Community
SARB	South African Reserve Bank
SAT	South African Tourism
SISM	Southern Illinois Swamp Model
SITA	State Information and Technology Agency
.shp	shapefile
SSS	Sensation Seeking Scale
StatsSA	Statistics South Africa
STIP	Sustainable Tourism Infrastructure Planning
TALC	Tourist Area Life Cycle Model
TAM	Technology Acceptance Model
TAMM	Technology Acceptance Model for Mobile
TEP	Tourism Enterprise Project
TGS	Tourism Growth Strategy
TIA	Tourism Industry Association

TKZN	Tourism KwaZulu-Natal
TSA	Tourism Satellite Account
UKZN	University of KwaZulu-Natal
UN	United Nations
UTMS	Universal Mobile Telecommunications System
UNWTO	United Nations World Tourism Organisation
VR	virtual reality
WiFi	wireless fidelity
WLAN	wireless local area network
WMS	Web Map Service
WTTC	World Travel and Tourism Council
WTTERC	World Travel and Tourism Environmental Research Council
WWW	Wold Wide Web

Chapter 1: Introduction and background

1.1 Introduction

This study was conducted in the province of KwaZulu-Natal (KZN). Due to KZN's unique and abundant natural and traditional cultural tourism resources KZN is blessed with some of South Africa's most pristine attractions. The province has two world heritage sites (Department of Government Communication and Information Systems, 2010/2011) and six beaches received blue flag status (Blue Flag, 2011). Over and above the recognised sites mentioned, there is a plethora of other highly attractive natural sites ideal for tourism. The Zulus are the dominant indigenous cultural tribe in KZN. They practice ancestral and traditional living, predominantly in the remote parts of the province. The mixture of natural beauty and traditional culture is ideal for the adventure traveller. This type of traveller is keen to get "off the beaten track into fragile environments and/or communities that are socially vulnerable" (Swartbrooke, Beard, Leckie & Pomfret, 2003:196). These adventure locations are often situated in the remote wilderness where conditions are somewhat primitive. Visiting these areas usually involves the use of a guide or tour leader (Ewert & Jamieson, in Wilks & Page, 2003:69).

In KZN, "approximately 29% of all the 2003 foreign visitors engaged in some form of adventure tourism; this equalled to ± 348 000 people" (Kohler, 2004:20). "Total spend was estimated at R6 500 per trip; the total spend related to adventure tourism is, indirectly ± R2.3 billion" Kohler (2004:20). The tourism authority of KZN, Tourism KwaZulu-Natal (TKZN), recognised that sports and adventure are two of the defining tourism activities in the KZN province. The 2003 to 2006 TKZN tourism strategy further identifies the potential of these activities. The driving force behind the strategy was to build on these activities and to strengthen existing attractions that occur in abundance (Kohler, 2004:3).

In order to place this growing and evolving tourism market, and especially adventure tourism, in KZN in perspective, it is necessary to look at the geography of tourism as well as at some important terminology relating to the study. This is followed by a brief review of the South African tourism sector, as well as the state of tourism in KwaZulu-Natal. Attention is also given to concepts related to adventure tourism and

adventure hotspots. This chapter culminates with details of the research design and the organisation of the thesis.

1.2 Geography of tourism

In the last 50 years, tourism emerged into one of the world's most powerful, yet controversial, socio-economic forces and was often referred to as "the largest peaceful movement of people across cultural boundaries in the history of the world" (Telfer & Sharpley, 2008:1). Greater numbers of people achieved the ability, means and freedom to travel. The scale and scope of tourism has grown exponentially. In 1950, an approximate total of 25 million international tourist arrivals were recorded worldwide. In 2004, international arrivals were recorded at 750 million. In 2005, approximately 800 million international tourists were recorded worldwide, and in 2008, a number of 924 million were recorded (Telfer & Sharpley, 2008:1; KZN Department of Arts, Culture and Tourism, 2008:26).

International tourism receipts hit new records in most destinations in 2011, reaching an estimated R7.38 trillion worldwide in 2011, up from R6.98 trillion in 2010 (UNWTO 2012).With current forecasts, a staggering R157 trillion is expected by 2020 (Telfer & Sharpley, 2008:1). Jamieson (2006:3) states that tourism provides one out of every 10 jobs worldwide. Given the remarkable growth of tourism in the world, it is not surprising that developing nations of the world consider tourism as an effective means to achieve economic and social development. Developing nations of the world observed a steady rise in tourism. Over the last half century, there was a gradual shift from the traditional destinations in Europe and North America to other more remote, less developed regions of the world (Telfer & Sharpley, 2008:24).

During the past 20 years, Africa saw a significant increase in tourism development. During the 1990s, tourism in Africa grew at an average annual rate of 6.2 percent, in contrast to 4.3 percent in the rest of the world. Nature-based tourism is the main component of the African tourism product, and the continent boasts a wide range of natural attractions (Spenceley, 2008:15). The South African Development Community (SADC), together with the New Partnership for Africa's Development (NEPAD), identified and reported on trends from the Southern African region. These trends indicate that the Botswana and Namibia tourism markets are still maturing.

Zambia, Mozambique, Tanzania and Madagascar are emerging countries in terms of tourism growth. Zimbabwe's tourism market regressed, and the tourism potential of Lesotho and Swaziland is steadily rising. NEPAD made tourism a "priority sector with the potential to diversify economic opportunities and generate income and foreign exchange earnings for African countries" (Spenceley, 2008:16). This is in accordance with the African Union (AU) and NEPAD tourism action plan, agreed on at the AU's third general assembly held in Ethiopia in July 2004.

Geographical thought is an important component of tourism studies. It aids the tourism geographer to understand where the tourist originated from; his/her reasons for embarking on the journey; and what the impacts of his/her actions on the environment that he/she is visiting, would be. Tourism is not static to one location on earth. Tourism studies make a distinction between places of origin, tourist generating areas, tourist destinations and places of tourism supply, as well as the relationships between origin and destination. Tourism can therefore be referred to as 'geography-in-action' since it occurs in places and involves movement and activities across geographical space. It is an activity in which both place characteristics and personal self-identities are formed through the relationships that are created among places, landscapes and people. According to Smith (1995:5), research done by geographers contributes to tourism knowledge in several other ways.

- It delineates tourism regions for the effective structuring of a tourism sector and associations.
- Geographic research forms the foundation for estimating visitor volumes and expenditures.
- The interpretation of the morphology of tourism destinations aid in planning and impact assessment studies.
- Geographical research assists developers to make sense of the many inter-related geographical features at a potential tourism business site. Understanding how these features relate is the cornerstone of geographical research.

According to Smith (1995:5), a geographical perspective reminds other social scientists studying tourism that a distinctive aspect of tourism research is the importance of space and how travellers respond to space (Smith 1995: 5).

Tourism Geography as an academic discipline that can be traced back to the 1920s in the United States of America (USA). According to Mitchel & Murphy (1991), one of the first US refereed geographical journal articles on tourism, was published in 1933. A continuous thread of tourism research can be traced to the present (Mitchel & Murphy 1991:59). Tourism impacts on a number of inter-related facets of society and is not an exclusive industry. No single sector can belong exclusively to tourism. Tourism is not really an industry in itself, "it is an economic activity that runs through society involving many different sectors" (Dowell, 1997:1)

Tourism resources can be categorised into natural resources and cultural resources. Natural resources are split into flora, landscape, fauna, climate and water, whereas cultural resources refer to "certain aspects of current society and how people from different areas and ethnic origin live, work and play" (Godfrey & Clarke, 2000:66). Table 1.1 provides a listing of the details of the geographical features related to different categories of natural and cultural tourism resources.

Table 1.1: Natural and cultural resources of tourism (Godfrey and Clarke, 2000:66)

Index of Natural Resource Elements	
Type/class	Description
Flora	Forested areas; orchards - hard & soft fruit; specialist farms; trees - autumn foliage, first growth conifers; vineyards; wilderness; wild flowers - meadows; rare / endangered; spices and herbs.
Landscape	Beaches; causeways; caves; cliffs; coral reef; desert; unique land forms; geological formations - glacial, wind, rain; gorge/canyon; islands; mountains; plains; spits; sand dunes; semiprecious gemstones; swampland; valleys; plateaux; volcanoes.
Fauna	Birds - aquatic, large/birds of prey, rare/endangered; insects; wildlife – large/big game, small, rare/endangered, marine mammals; domesticated.
Climate	Seasonal - spring (blossoms), summer (dry/humid), autumn (foliage), winter (snow); arid; temperate; tropical; continental; coastal; alpine; wind.
Water	Rivers – slow meander, rapids, cataracts; lakes; estuaries; thermal springs; geysers; springs/wells; waterfalls; ocean/sea; snow/ice.
Index of Cultural Resource Elements	
Cultural religious	Mosques; synagogues; temples; churches – cathedrals, chapels, missionaries, frontier/pioneer; burial grounds; shrines; pilgrimage sites; other religious.
Heritage	Castles; forts; historic birthplaces; historic buildings; historic settings – cottages, mansions, villages/towns, ghost towns, folklore; museums – modern, antiquities, specialist collections, anomalies, science/technical; monuments; ancient/derelict ruins-aboriginal, indigenous, prehistoric, Bronze age, Celtic, Roman, Norman, Renaissance, Medieval, industrial revolutions; interpretation centres; landmarks; battle sites; ancient roads or paths.
Other	Ethnic celebrations; indigenous culture - dance, dress, language/dialect, food & drink, music, art, work & industry, craft work; archaeological sites; TV series location; famous residents; folklore; local traditions.

As the tourism industry matures, there is an increase in the demand for special life-changing experiences. Tourists are expressing their desire to know more about the destinations they visit and not to just be mere tourists taking pictures. Travel has become more of an emotional and philosophical affair than just a physical one. Spenceley (2008:114) notes that tourists are now taking more cognisance of their host destination's natural and cultural environment. She also found that fulfilment levels tend to improve if consumers, travellers and tourists believe that their visit is contributing positively to the host location. This yearning for a more purposeful experience described above resulted in a growing trend among tourists from the developed countries to undertake holidays to the developing countries of the world. Egmond (2007) states that one of the important reasons for this trend to venture to the developing countries is to escape the hectic daily life they are faced with in their country of origin, and to experience something totally different. Other reasons why westerners choose to go to the developing countries are "different cultures, lifestyles, landscapes and learning more about the world" (Egmond, 2007:27). This trend impacts positively on the economy of developing countries. A study found that tourism is the primary source of foreign exchange earnings for 46 of the 50 least developed countries (International Finance Corporation, 2012).

1.2.1 Tourism terminology

The roots of tourism are deeply embedded in the theoretical foundations of recreation and leisure (Swartbrooke et al., 2003:6). Recreation is often intertwined with leisure and *vice versa*. These recreation and leisure foundations of tourism are characterised by the following: self-expression, satisfaction and enjoyment, difference from normal employment and freely chosen. This subsection will consider the details of some of the more important definitions of tourism that apply to the research.

A definition of tourism was proposed by the United Nations World Tourism Organisation (UNWTO). The definition describes tourism as "the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (StatsSA, 2011a:18). A traveller is "someone who moves between different geographical locations for any purpose and any duration" (StatsSA, 2011a:18). A visitor refers to "any person

travelling to a place other than that of his/her usual environment for less than 12 months and whose main purpose of the trip is other than the exercise of an activity remunerated from within the place visited" (StatsSA, 2011a:18). A same-day visitor is a visitor who "visits a place for less than one night" (StatsSA, 2011a:18). A tourist (overnight visitor) is a "visitor who stays at least one night in collective or private accommodation in the place visited." A foreign traveller, in the South African context, refers to a "traveller who is not a South African citizen or permanent resident" (StatsSA, 2011a:18).

Plog (1972 as cited by* Shaw and Williams, 1994:71) proposes classic tourist typologies. He coined the terms allocentrics and psychocentrics. He suggests that the 'allocentrics' are characterised by a high level of self-confidence that leads them to being venturesome. They also spend a substantial amount of their personal income on travel. It is the allocentric tourist who is prepared to take a risk in seeking out the strange or unfamiliar and who travels long distances to unfamiliar locations. 'Psychocentrics' are dependent, unsure and anxious and prefer to make safe and comfortable choices. They are less likely to travel to remote areas and more likely to go to discovered destinations that are well reviewed and well known

Cohen (1972, as cited by Egmond, 2007:60) studied the behaviour of tourists and identified four types. The first is the organised mass tourists travelling in groups and using package tours. The second type is the individual mass tourists using the same facilities as the first type, but who are more individualistic with regard to their tourist activity. The third type is the explorers who arrange their own 'off the beaten track' experiences, are keen to meet the locals and use the same infrastructure that the mass tourists use. Lastly, the drifters shun contact with the organised mass tourists, 'go native' by staying with locals, stay longer than most tourists and do not regard themselves as tourists .

Tourism, whether it occurs in the developed or developing countries of the world, plays a crucial role in preserving the natural integrity of the location. The **biodiversity** of an area is important for the area's sustainable existence.

* References referred to as 'as cited by' has not been read by the author. However, full bibliographical details of these references have been included in the reference list under 'Suggested reading' (see page 229)

Biodiversity in this sense can be defined as “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (Spenceley, 2008:13). Another important term in tourism is ecotourism. **Ecotourism** played an important role in tourism management in the last decade. The United Nations World Tourism Organisation (UNWTO) defines ecotourism as “all forms of tourism in which the tourists’ main motivation is the observation and appreciation of nature, that contributes to the conservation of, and that generates minimal impacts upon, the natural environment and cultural heritage” (Frangialli, 2001, as cited by Spenceley, 2008:14). A related term to ecotourism is nature-based tourism, which is motivated by “enjoying wildlife or underdeveloped natural areas” (WTTERC, 1993, as cited by Spenceley, 2008:13). Nature-based tourism may include attractions such as “scenery, topography, waterways, vegetation, wildlife and cultural heritage; and activities like hunting or white-water rafting” (Ceballos-Lasccuráin, 1996, as cited by Spenceley, 2008:14).

An important type of tourism, and specifically for the developing world context, is **wildlife tourism**. This type of tourism includes the “consumptive and non-consumptive use of wild animals in natural areas” (Roe, Williams & Clayton, 1997). Wildlife tourism is normally undertaken as self-drive excursions in own or hired vehicles or as guided walks or safari excursions where tourists observe and learn about the wildlife. The more appealing species to tourists are wild elephants, buffalos, lions and leopards. To experience wildlife, especially in developing countries, will sometimes involve extreme expeditions. **Expedition tourism** involves “journeys to remote, unusual and probably dangerous terrain” (Swartbrooke et al., 2003:24). This type of tourism usually involves a difficult and perilous journey to remote destinations. Confidence in the self is usually a strong personality trait needed to enjoy this type of adventure. Trends suggest that tourists now want to experience the local culture as well. **Cultural tourism** can be defined as “cultural aspects which are of interest to the visitor and can be marketed as such, including

the customs and traditions of people, their heritage, history and way of life" (KZN Department of Arts, Culture and Tourism, 2008:9).

To manage tourism responsibly is paramount. This responsibility rests not only on the shoulders of tourism practitioners, but also on the traveller. The concept of **responsible tourism management** will be discussed in greater detail in Section 2.4.1. Responsible tourism is rooted in sustainable tourism. Spenceley (2008:2) states that sustainable and responsible tourism is a holistic approach to tourism development. The gist of sustainable tourism is that it meets the "needs of present and future generations for goods and services in ways that are economically, socially and environmentally sustainable" (Spenceley, 2008:2). Responsible tourism can be defined as "tourism that promotes responsibility to the environment through its sustainable use, responsibility to involve local communities in the tourism industry, responsibility for the safety and security of visitors and responsible government, employees, employers, unions and local communities" (KZN Department of Arts, Culture and Tourism, 2008: 11).

1.3 South African tourism

1.3.1 A brief overview of the tourism sector

In South Africa, the two decades leading up to 1990 witnessed a "small domestic market and less than 1 million annual foreign arrivals" (SAT, 2010b: 31). With trade sanctions being lifted in the early 90s, South Africa witnessed a steady increase in tourism arrivals. With this increase, South African decision makers became more conscious of the potential of tourism to contribute to the development of the country. In 2004, tourism in South Africa was for the first time officially referred to as the 'new gold' of the SA economy — see the Tourism Growth Strategy (TGS) published by South African Tourism (SAT). The Business Day newspaper (2004, in SAT, 2010b) reported that "the total foreign direct spend of tourists has overtaken gold foreign exchange earnings and has outperformed all other sectors in terms of both GDP and job creation" (SAT, 2010b: 31).

It is important to state that SAT changed there method of reporting on tourist numbers before 2009. In 2009, they began excluding day visitors from their reporting and thus it appeared that there was a drop in the number of tourists (StatSa 2012).

By 2009, SA had grown to a destination that welcomed approximately 9,9 million visitors. The 2010 Tourist Satellite Account (TSA) estimated that the sector contributed R67 Billion, or 3% of SA's Gross Domestic Product (GDP) (NDT, 2011c:1). Spenceley (2008:15) stated that the South African Tourism industry is still very small compared to the rest of the world. In 2007 it only represented 1.3 per cent of the world tourism market. However, since the 1990s, tourism grew at an annual rate of 6.2% in contrast to 4.3% for the world (Spenceley, 2008:15). A report from Statistics South Africa (StatsSA, 2011a) concluded that a comparison between movement in February 2010 and February 2011 indicates an increase in all movement. The 2011 StatsSA report stated that arrivals increased by 23.2%; from 285 392 in February 2010 to 351 513 in February 2011. Foreign arrivals "increased by 11.9% from 816 363 in February 2010 to 913 162 in February 2011" (StatsSA, 2011a: 2). It is important to note that SAT changed the method of reporting on tourist numbers. In 2009, they began excluding day visitors from their reporting and thus it appears that there was a drop in the number of tourists (StatsSA, 2012).

South Africa, similar to the continent as a whole, is richly endowed with some of the most impressive attractions that can be packaged for local and international tourism. Nature-based tourism is one of the most important components of the South African tourism product, and the country can proudly boast a wide range of natural attractions (Mukogo, Dieke, Razafy & Nyakunu, 2004). Swartbrooke et al. (2003:100) identified that the South African tourism market consists mostly of wildlife watching. Other types of tourism are beach, wine and cultural tourism. Urban tourism does exist, but is hampered by the relatively high crime levels. The steady rise in popularity of South Africa as a tourist destination also resulted in international events being hosted by South Africa. The FIFA World Cup soccer tournament held in SA during 2010 is a good example. According to research undertaken by South African Tourism (SAT), as well as a Statistics South Africa (StatsSA) report, the year 2010 proved to be, as expected, a record with regard to tourism in South Africa. The SAT (2010a:2) report on the FIFA World Cup concluded that a total of 309 554 foreign tourists arrived in South Africa to partake in the sport and festivities of the 2010 FIFA World Cup. A staggering R3.64 billion was added to the local South African economy. The FIFA World Cup contributed largely to boosting the tourism growth to 15.1% for the year 2010. This is an improvement on the 4.5 annual predication

growth predicted by the World Travel and Tourism Council (WTTC) (WTTC, 2007). The success of the 2009 Confederations Cup also contributed to this rise in tourism. Government spent vast amounts of money on upgrading infrastructure such as roads, telecommunications, safety and security, airports and stadiums. These events created a legacy that will undoubtedly forge South Africa into a top class tourist destination (NDT, 2011c:10). With the successes of the Confederations Cup and the FIFA World Cup, the SAT (2010b:6) Tourism Growth Strategy (TGS) proposes that the target market for SA is leisure travel, including both domestic and international, business tourism conferences and meetings, as well as incentive travel and mega events including sports and cultural events. One of SAT's main challenges will be to ensure constant inflows from seasonal markets and to convert markets from short-haul to long-haul travel (SAT, 2010b).

The past tragedies of the Apartheid era have been replaced with a resolute generation of South Africans. Tourism steadily increased and was further boosted by the 2010 FIFA World Cup soccer tournament. There seems to be a positive path forward for South African tourism. However, the country still has a long way to go in terms of becoming a top world tourist destination (NDT, 2011a:4).

1.3.2 Factors impacting on current SA tourism

Spenceley (2008) undertook a study of the South African tourism sector which replicated the Tearfund (2001) methodology in order to "evaluate to what extent South African tour operators were engaging in responsible management practices" (Spenceley, 2008:114). The study involved surveying 20 small-sized tour operators who participated in the 2006 Tourism Indaba in Durban. Spenceley (2008) noted that the main finding relevant to the South African and Southern African context was a low level of understanding in relation to the important policies. Other negative findings were the lack of proper government support and distrust in the government support structure. Distrust also exists with regard to safety or security when using small suppliers in the tourism business. Crime on tourists in remote areas, corruption and overcharging also pose a serious problem. Besides the actual problem of crime and violence, perceptions of high crime are also a hindrance. Tourism is a unique industry in that an isolated incident of crime in a remote area can have a huge impact on the area for years to come. Lastly, an important element identified as a

factor impacting on SA tourism is the concern of training and the managing of skills development of local communities and service providers (Spenceley, 2008:125).

The global economic crisis since 2008 has had a major impact on the global and South African tourism industries. It resulted in “consumer and business confidence falling amidst rising global unemployment” (SAT, 2010b:47-48). This had a ripple effect on consumers’ needs as they began demanding more value for their money.

SAT (NDT, 2011c) noted that the tourism sector in the country is still rather fragmented. Corporations and firms at different levels of the value chain often battle to secure opportunities for cooperation and collaboration. The supporting institutions and organisations, whether from the public or private sector, are relatively new and face regular problems, including lack of confidence and legitimacy, as they struggle to find adequate skills and resources.

Lastly, the former Apartheid regime had an impact on the travel culture of black South Africans. Because of past policies, Black South Africans did not have the opportunity to travel to preferred destinations in their own country. A concerted effort is required to tap into this vast market (NDT, 2011c:34).

1.3.3 Management of SA tourism

The National Department of Tourism (NDT), based in Pretoria, is the highest authority on tourism in South Africa. The department has been in existence since the 2009 general elections (NDT, 2011a:6). Pre 2009, the national authority of tourism fell under the jurisdiction of the DEAT — Department of Environmental Affairs and Tourism (DEAT 2009/10:3).

Tourism is primarily regulated by the Tourism Act (Act no. 72 of 1993) and the White Paper on the Development and Promotion of Tourism in South Africa (South African Government Services, 1996). The Act (Act no. 72 of 1993) provides for the promotion of tourism to and in South Africa, as well as for the further rationalisation of the tourism industry. The Tourism White Paper provides a framework and guidelines to achieve the objectives of the Act (Spenceley, 2008:4). Together, the legislation “envisions the sustainable and acceptable development of the tourism

sector as a national priority, enabling the sector to contribute significantly to the improvement of all South Africans' quality of life" (Spenceley, 2008:4). SAT is the public entity responsible for marketing South Africa as a top class destination. SAT's core objectives are to monitor and evaluate the performance of the tourism sector.

Responsible tourism in Southern Africa was spear-headed by the New Partnership for African Development (NEPAD) which, in 2001, compiled a strategic framework document. The document highlighted a few driving points for the challenges the African continent faces. Some of these challenges are rising poverty levels, underdevelopment and continued marginalisation of Africa. The most important objective of NEPAD was to devise a strategy that takes advantage of tourism to eradicate poverty. NEPAD also suggested a regional marketing strategy, research capacity and partnerships that need to be developed at regional and sub-regional levels (Spenceley, 2008:4). Another aim was to forge regional coordination relationships between Southern African countries. In 2002, Cape Town hosted a conference on Responsible Tourism in Destinations. The conference resulted in the Cape Town declaration for responsible tourism. The main aims of the declaration were: to reduce negative economic, environmental and social impacts; to propagate greater economic benefits for locals that will enhance the wellbeing of host communities; to engage locals in decision making; to make positive contributions to the conservation of natural and cultural heritage and to the maintenance of the world's diversity; to present tourists and travellers with memorable experiences through worthwhile connections and relations with local people; to instil greater understanding with regard to culture, social and environmental issues; to ensure that physically challenged people have access to tourism resources; and to instil pride and feelings of self-worth in tourists and hosts and build local pride and confidence (Cape Town 2002, as cited by Spenceley, 2008:5-6).

Decision makers responsible for the management of tourism in South Africa rely heavily on the availability of reliable statistics. Statistics South Africa (StatsSA) is responsible for a number of key reports related to tourism. A relevant report is the P0351 statistical release on tourism and migration (StatsSA, 2011a). The data in this report is based on statistics collected by the Department of Home Affairs at ports of entry to South Africa. The report is processed and released by Statistics SA and SA

Tourism (SAT). The second relevant report is the Tourism Satellite Account (TSA), which is an initiative by the UNWTO. The TSA provides an international methodological framework to national tourism bodies to collect statistics useful to national and international organisations. The TSA is a collaborative effort between the United Nations (UN), the World Bank, the International Monetary Fund (IMF) and the Organisation for Economic Cooperation and Development (OECD). A number of role players need to deliver information for the SAT TSA report to be valid. These role players include Stats SA, South African Tourism (SAT), the former National Department of Environmental Affairs and Tourism (DEAT), National Department of Tourism (NDT), the South African Reserve Bank (SARB), the Department of Home Affairs (DHA) and the Department of Trade and Industry (DTI) (StatsSA, 2011b: 1-3).

It is important to briefly mention the role of the National Environmental Management Act (NEMA) (South Africa 1998, Act 107 & South Africa 2003, Act 50). The NEMA legislations aim at: preventing pollution and ecological degradation; promoting conservation; securing ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

1.4 KwaZulu-Natal — the study area

1.4.1 A brief overview of the KZN tourism sector

The KZN Province is blessed with an abundance of natural pristine resources and traditional culture.. Table 1.2 highlights some general statistics and facts about the KZN Province, which reveal why KZN has some of the ideal conditions for tourism to flourish.

Table 1.2: KZN provincial information (TKZN, 2010: 13; South African Information, 2011; Blue Flag, 2011; StatsSA2011c)

KZN total area	94 361km²
Population estimate	10 819130
Percentage of total population	10 819130
Area as a % of South Africa	7.70%
Continued on next page	

Climate	Sub-tropical. Summer average (17-28˚C), Winter (average (11-25˚C)
Population	10.44 million (mid-2009) — (21.2% of total South African population)
Harbours	Durban & Richards Bay
Airports	Oribi, Richards Bay, Virginia, Margate, King Shaka International
World heritage sites	The iSimangaliso Wetland Park and uKhahlamba Drakensberg Park
Blue flag beaches	Margate, San Lameer, Ramsgate, Trafalgar, Lucien beach, Umzumbe beach

The provincial government authority for tourism is managed by Tourism KwaZulu-Natal (TKZN). TKZN is responsible for the development, promotion and marketing of tourism into and in the province. As shown in Figure 1.1, there are eight tourism regions in the province: Elephant Coast, Zululand, Durban, South Coast, Midlands, Battlefield and uKhahlamba Drakensburg (TKZN, 2008). Each of these regions has a delegated TKZN member who reports to the Provincial Tourism Forum (PTF). It is these PTF members that participated in a questionnaire survey that will be discussed in Chapter 3.

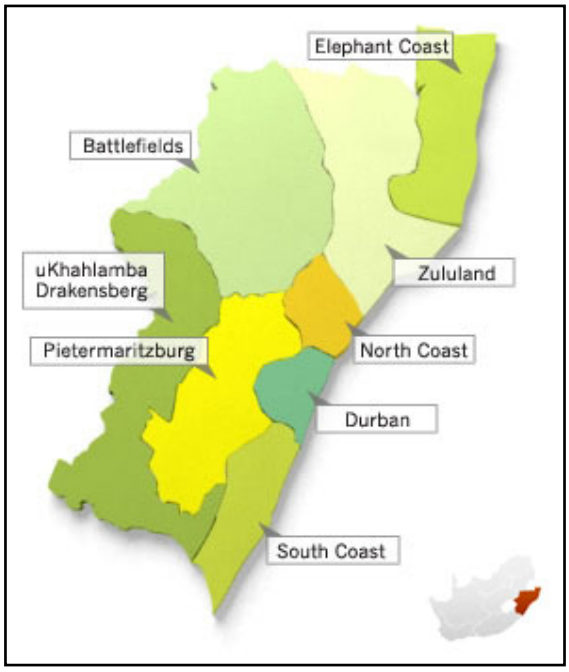


Figure 1.1: TKZN tourism regions (TKZN, 2011)

KZN is bordered by the warm Indian Ocean to the east and the escarpment range of the Drakensberg mountain range to the west. The low lying coastal regions make way for the rolling hills of the Midlands before towering to higher altitudes of the Drakensberg mountains. With its sub-tropical climate, it has perennial green vegetation along the coastal regions.

There are also extensive coastal forests found on some of the world's highest sand dunes along the northern coastline (South Africa Information, 2011).

Although KZN may be blessed with some of South Africa's most attractive natural resources, the province also faces a number of significant problems and challenges. A significant challenge is the high levels of unemployment and high incidence of HIV/AIDS (KZN Department of Arts, Culture and Tourism, 2008: 14). The province of KZN contributes approximately 15% of South Africa's GDP. This contribution is mostly attributed to the flourishing agriculture and forestry sectors that are supported by a dependable network of road infrastructure. The "growth rates in excess of the national average are also driven by the financial and business services sector" (KZN Department of Arts, Culture and Tourism, 2008:15).

Tourism contributes approximately R20 billion to the province's GDP. KZN attracts "1.4 million foreign visitors and 11.9 million domestic tourism trips on an annual basis" (TKZN Strategy, 2008:4). Some relevant statistics about the KZN foreign visitor situation is summarised in Table 1.3.

Table 1.3: KZN foreign tourist statistics (SAT 2010, in TKZN, 2010:2)

Foreign tourist stats 2009	
Number of tourists annually	± 9.933 million
Average spend per visitor per day	± R1 110
Average length of stay	7.5 nights
Main source markets	UK, USA, France, Germany, Netherlands

The 2009 top 10 foreign tourism source markets are listed in Table 1.4. The inclusion of countries such as Swaziland, Lesotho and even Zimbabwe may be questioned. Being on South Africa's doorstep, citizens of these countries can cross the border with relative ease and at low cost. The findings suggests that many such tourists would most likely be visiting South Africa primarily for bulk shopping and would stay with friends and/or family resident in South Africa. These visitors from South Africa's neighboring countries will spend less money on the trip since they only are here for a few days and hardly spend any money on accommodation and normal tourist activities (TKZN, 2009c: 11).

Table 1.4: Top 10 foreign tourism source markets in 2009 (SAT, 2010 in TKZN, 2010:4)

Country ranking	Country	Percentage	Actual numbers
1	Swaziland	30%,	365 498
2	Lesotho	15%,	184 648
3	United Kingdom	8.6%,	103 665
4	Zimbabwe	8%,	97 580
5	USA	3.8%,	46 264
6	Botswana	3.8%,	45 984
7	France	3.5%,	42 878
8	Germany	3.3%,	39 863
9	Netherlands	3%,	36 046
10	Zambia	2.5%,	26 777

Table 1.5: KZN domestic tourism statistics (SAT, 2010 in TKZN, 2010:4)

Domestic tourist statistics (2009)	
Number of tourists annually	± 8.8 million trips,
Spend per trip	± R720
Spend, total direct value	R6.34 billion direct spending
Average length of stay	4.3 nights
Main source markets	KZN, Gauteng Province

With regard to the domestic tourist scene (see Table 1.5), KZN is ranked as the number one domestic market (TKZN, 2010:7). The main reasons why domestic tourists come to KZN are to visit friends and relatives (50.7%), holiday/leisure (36.4%), business (6.5%) and other (6.4%). A number of events boosted tourism in the province. These are the Dusi Canoe Marathon, the Midmar Mile, the A1 Grand Prix, the Splashy Fenn, the Tourism Indaba, the Comrades Marathon, the Durban Fashion Week, the Durban July, Beach Africa and the Loerie Awards. These events, together with the general spread of tourists across the province, directed TKZN decision makers to identify a number of nodes and corridors that are the focus of existing and future planning. Figure 1.2 illustrates the distribution of these nodes and corridors. The dark blue spots highlight the nodes and the light blue and green areas signify the corridors.

Figure 1.2: Illustration of proposed tourism nodes and corridors in KZN (SAT, 2010 in TKZN, 2010:15)

1.4.2 Management of KZN tourism resources

Management of the KZN resources is mandated by Section 28 of the KwaZulu-Natal Tourism Act, Act no.11 of 1996. An amendment to this act resulted in the Tourism Amendment Act, Act no. 2 of 2002. The White Paper on the Development and Promotion of Tourism in KwaZulu-Natal (KZN Department of Arts, Culture and Tourism, 2008) is an important document that steers management of tourism in KZN. The White Paper took the following frameworks into consideration: the Tourism Growth Strategy (TGS), the Provincial Growth and Development Strategy (PGDS), the Broad-based Black Economic Empowerment Act of 2003, and the Accelerated Shared Growth Initiative for South Africa (ASGISA). The focus of the 2008 White Paper is to "… *develop a common strategy for the international marketing and promotion of South Africa as a joint effort among the private sector, the national organisation and provincial authorities, taking cognisance of international trends and the competitive environment; to fund international marketing efforts from private sector, national and provincial resources; to participate in supporting the international marketing effort by the national body; to play a more prominent role in tourism development activities, than the national government*" (KZN Department of Arts,

Culture and Tourism, 2008:19). Over and above the focus, the White Paper states that "*it should include the involvement of local communities; environmental management, safety and security of visitors, tourism plant development, infrastructure provision and to ensure budgets and resources allocated to provinces reflect this reality*" (KZN Department of Arts, Culture and Tourism, 2008:19).

TKZN is the organisation responsible for the "development, promotion and marketing of tourism into and within the province" (TKZN, 2008:2). The organisation was established in accordance with the KwaZulu-Natal Tourism Act, Act no.11 of 1996, referred to earlier. One of the earlier recorded management strategies in the province was the analysis undertaken by Ferrario (1981) during 1980 and 1981. A comprehensive study was undertaken to identify corridors and nodes of attractiveness. Now, with the growth of KZN tourism steadily rising, there are a number of strategic tourism management frameworks. These are the TKZN strategic plan (206-2011), the Provincial Growth and Development Strategy (PGDS), the Provincial Spatial Development Framework, the National Tourism Growth Strategy, the National Tourism Domestic Growth Strategy, the Segmentation Study and the Global Competitiveness Study (TKZN, 2008:2).

Management of the natural resources dedicated to tourism is headed by Ezemvelo KZN Wildlife (EKZNW). EKZNW is a world-class organisation achieving national and international awards for contributing to conservation and eco-tourism. With its world-class operating standards, it achieved world heritage status for the isiMangaliso Wetland Park and the uKhahlamba Drakensberg Park (KZN Department of Arts, Culture and Tourism, 2008:59). EKZNW is also responsible for a host of private conservation initiatives and community involvement projects. The EKZNW's objectives are guided by the Provincial Spatial Development Framework (PSDF). The objectives of this framework are to promote the sustainable development of the natural resources of the province and to minimise conflict with other proposed economic activities (KZN Department of Arts, Culture and Tourism, 2008:34).

The coastal region is managed by, firstly, the **DEAT's Coastal Management Branch**. Their main aim is to monitor threats of degradation and misuse. The Blue Flag beach status programme works in collaboration with DEAT. The criteria are low

pollution, clean and high-quality ablution areas and, most importantly, professional lifeguard services. The KZN Sharks Board is another important organisation involved in assisting with the management of the coastal region of KZN. This is achieved by researching the behaviour and reproduction patterns of sharks, providing buoys and netting to deter sharks from attacking bathers and to prevent the drowning of this species in nets (KZN Department of Arts, Culture and Tourism, 2008:34). Cultural resources are managed primarily by the **Department of Arts and Culture**. One of their main objectives is to transform art and culture "from being economically marginalised to becoming part of the economic mainstream" (KZN Department of Arts, Culture and Tourism, 2008:35). The department is assisted by Heritage KwaZulu-Natal (AMAFA) (AMAFA, Heritage KZN, 2011). AMAFA is a statutory body brought into existence by the KZN Heritage Act of 1997. Their main objective is to conserve, protect and administer the heritage resources of the province in terms of the Act (KZN Department of Arts, Culture and Tourism, 2008:35).

TKZN is tasked with ensuring that responsible tourism is practiced at all levels of the organisational structure. TKZN aims to forge partnerships with key service providers, such as Tourism Enterprise Project (TEP) and Ithala Development Finance Corporation (Ithala). These organisations can mentor and assist Small Micro Mini Enterprises (SMMEs'). As part of TKZN's mandate to responsibly manage tourism in the province, they are also tasked with developing effective management information technology and systems. The aim of this is to provide "relevant information systems to tourists and the other key stakeholders and partners about the destination" (TKZN, 2008:17).

Management of KZN tourism resources offers a unique opportunity to decision makers. "*There is something about this warm and friendly province which continues to draw tourists from all around the globe. World-class beaches, majestic mountain ranges and a rich cultural history are just some of the diverse attractions which keep visitors coming back*" (KZN Department of Arts, Culture and Tourism, 2008:16).

1.4.3 Managing adventure tourism in KZN

As was mentioned in the opening section, approximately 348 000 adventure tourists, accounting for 29% of all tourists, visited the KZN province in 2003. These foreign

visitors (people who are not citizens of South Africa) spent approximately R6 500 per trip, totalling an impressive R2.3 billion for adventure tourism for KZN in 2003. TKZN identified sports and adventure as two critical types of tourism in the province. The importance of sport and adventure tourism was further substantiated in the 2003 to 2006 TKZN tourism strategy (Kohler, 2004:4).

Sport tourism can fall into two categories: travel to participate in sport and travel to observe sport. Therefore, sport tourism may be defined as "travel for non-commercial reasons, to participate or observe sporting activities away from the home range" (Hall 1992, cited by Weiler & Hall 1992: 147). KZN has a variety of sporting activities to offer that are often also referred to as adventure activities. Kohler (2004: 4) suggests that the dividing line between adventure and sport is frequently blurred, sometimes absent. TKZN suggests that the expectations of the tourist evolved. Nowadays it is not just about the sport; rather it is more about a full-on adventure experience related to the sport activity. Trends suggest that this full-on experience could involve interaction with the locals in the vicinity of the sport activity. With the steady growth in sport and adventure products, TKZN is faced with a formidable task of managing a province that is richly endowed with adventure resources. TKZN laid the steps to streamline the adventure tourism sector in KZN. TKZN has approximately 757 registered tourist guides and 350 tour operators. TKZN is putting measures in place to ensure that the adventure suppliers have the necessary specialised skills and are qualified to offer adventure activities to tourists. As part of this strategy, TKZN's website has been modified to deal specifically with adventure tourism (Kohler, 2004).

1.4.4 Adventure hotspots in KZN

The 21st century has seen a mind-shift in travelling expectations. Boniface (2001:36) coined the term "dynamic traveller who is more sight-involved than in sight-seeing". The dynamic traveller is more inclined and able to understand the destination and to evaluate the significance of the experience on his/her own life.

Travellers are keen to escape the mundane routine of their normal work-life and are in search of an experience that would take their minds as far away as possible from their normal routine in urban areas. KZN offers this experience. Its variety of natural

features and indigenous cultures makes it the perfect setting for the ‘dynamic traveller’.

TKZN defines adventure tourism as “a type of tourism which takes places in a destination which offers nature-based tourism but which in itself offers some measure of uncertainty, risk or increased levels of physical activity ” (Kohler, 2004:7). Kohler (2004:7) states that adventure tourism includes adventure travel, ecotourism, nature tourism, outdoor tourism, special interest travel, soft adventure, hard adventure, spiritual tourism, cultural tourism, extreme sports, wilderness tourism, safari tourism and trekking tourism.

Adventure is for the intrepid traveller and usually involves “people travelling off the beaten track into fragile environments and/or communities that are socially vulnerable” (Swartbrooke, 2003:196). Trends in developing countries suggest an increasing popularity of exotic locations, different cultures and rare wildlife. In a way, the lack of infrastructure and difficult terrain are in itself an adventure. The prime motivator for adventure tourism is often the need to avoid the more common tourist paths and to get away from the masses. This means that this form of tourism has the potential to spread its negative impacts over a relatively wide geographical area (Swartbrooke, 2003). An important finding by Swartbrooke (2003:17) is that the activities and setting generally linked to adventure are in the outdoors, wilderness, remote, unusual or exotic locations. This point is further substantiated by Wilks & Page (2003), who state that an adventure tourism activity “often includes a small group of participants, visiting an exotic and/or remote location, often under somewhat primitive conditions, and utilising the services of a guide, leader, and outfitter” (Wilks & Page, 2003:69).

Tourism studies have identified that there are many types of travellers who could potentially be interested in a pristine natural setting, away from overcrowded congested cities. However, it is the adventure-traveller who, in the context of the KZN tourism resources, stands out above the rest. The adventurer “*is not only interested in the pristine outdoors away from the built-up areas but also in an activity where he/she is most likely to voluntarily put themselves in a position where they believe they are taking a step into the unknown, where they will face adrenalin*

related challenges, and where they will discover or gain something valuable from the experience" (Swartbrooke et al., 2003:14). Stepping into the unknown, the adventurer is likely to enter into "explore mode" at the destination, and destined to venture off the beaten track. He/she is thus likely to want to move around at the destination seeking out spontaneous discoveries. An area with an abundance or variety of natural pristine resources would therefore suit the adventurer. The term 'hotspot' was used in this study to refer to those locations that embrace all the above-mentioned adventure tourism destination characteristics. These 'hotspots' will either be areas that are already established adventure tourism hotspots or areas that have the potential (in terms of their characteristics) to become adventure tourism hotspots. The term 'hotspot' will be used as a synonym for both types. .

Two important considerations evolve from the paragraph above.

- Firstly, it is the adventurer's very desire for an adrenalin thrill in the pristine remote natural outdoors that makes him/her likely to forget about responsible behaviour, since all his/her senses are focused on the unfolding adventure and not on educational information that he/she absorbed on the way to the adventure activity. This behaviour has the potential to impact negatively on the natural features, as the natural environment will degrade after a few years of abuse.
- Secondly, there is the issue of culture shock. The foreigner or even a domestic adventurer is most likely not familiar with the indigenous Zulu traditional way of life. According to Hofstede (1980), "visitors from a foreign culture adopt a mentality of a child and learn the simplest things over again" (as cited by Reisinger & Turner, 2003:57). Culture shock can have a negative impact on the tourism experience. This negative impact often leads to distress and helplessness and, inevitably, results in unpredictable behaviour. This unpredictable, irrational behaviour would most likely strain the relationship between guest (the adventurer) and host, impacting negatively on the tourist economy.

Considering the two points above, it seems as if the adventurer (foreign adventurers in particular) will be faced with a combination of variables that would impact positively and negatively on his/her experience. It would be useful to know where these pristine, remote, natural adventure hotspots are. Also, it would be useful to know what makes the hotspot pristine, i.e. what the variables are that give it its

‘pristine’ identity? It would also be valuable to find an insightful way to communicate responsible travel tips to the adventurer along the journey. These tips should specifically focus on the vulnerable traditional-cultural resources and the fragile natural resources of the destination.

It is an opportune time to define the adventurer in the context of the ‘tourist versus the traveller’ debate. The traveller is an active individual who goes strenuously in search of people, of adventure and of experience. The tourist is a passive individual who expects interesting things to happen to him/her and goes sight-seeing (Culler, 1990: 1-3). This research focuses on the ‘adventurer’ who is indeed an ‘adventure traveller’ and not an ‘adventure tourist’.

1.5 Motivation for research

Research suggests that adventure tourism is steadily growing (Swartbrooke et al., 2003; Hudson, 2003; Sung, 2000; Kohler, 2004 and Rogerson, 2007). In the KZN province, remote pristine locations have an abundance of natural resources and are the ideal playing ground for the adventurer (Kohler, 2004). Activities such as mountain climbing, hiking and river rafting are some of the many possibilities at these locations or hotspots. Preserving the natural integrity of these hotspots for present and future adventurer travellers is important because if it is mismanaged by authorities or irresponsibly treated by tourists, the attractiveness of the hotspot will decline and tourists will be not eager to visit. Knowing where these hotspots are located is crucial for geographers, as it can lead to more decisive and knowledgeable decisions that will impact on the sustainability of the hotspots.

Adventure travellers are also attracted to an authentic cultural experience. The traditional culture of the Zulus makes an ideal setting for a cultural experience. However, it is likely that the foreign adventurer may experience a degree of culture shock when interacting with the local Zulus (Reisinger & Turner, 2003:57). The traditional character of the Zulus, in comparison to the western way of life of the foreigner, could cause the adventure traveller to experience a degree of culture shock when interacting with the Zulus. With niche technological tools it is now

possible to ensure that the interaction with the local indigenous tribe is harmonious and conducive to a sustainable relationship.

These niche technology tools involve advancement in Mobile Commerce (M-Commerce) and are fast replacing the traditional travel agent (NDT, 2011c:6). Traditional or conventional information sources are being replaced by ubiquitous information available to the adventurer by means of a mobile device. The adventure traveller now has the opportunity to be more independent because of access to location-based information while traversing the province. Important information relating to the sustainability of the natural and traditional cultural resources in and around adventure hotspots can now be done 'on the fly' with a mobile GIS. This knowledge could potentially enhance the responsible behaviour of the adventurer traveller, which in all probability will improve the sustainability of the hotspot's tourism resources.

Personal travel experiences in countries such as Thailand, India and Indonesia highlighted many similarities between the natural and traditional cultural resources found in the KZN province. Negative impacts of tourism, such as drug trafficking and prostitution, are rampant in these more mature tourist destinations (Smith, 1995:12). These negative impacts can have detrimental impacts on the tourism industry of a country. KZN is still a young tourist destination in comparison to India, Thailand and Indonesia, and can learn from and thus avoid the mistakes made by these more mature tourist destinations.

1.6 Statement of problem

Adventure travellers are interested in pristine remote hotspots, eager to participate in nature-based activities and also eager to interact with the local traditional culture. The first problem is to accurately identify these hotspots. The second problem arises when the adventurer ventures into hotspots without an understanding of the sensitive traditional cultural environment and the fragile natural environment. A few years of irresponsible behaviour can negatively interfere with or irritate local traditional cultural values. Irresponsible behaviour can also result in the contamination or pollution of the fragile natural environment making it less desirable to visit.

1.7 Aims and objectives of study

1.7.1 Aims

Before hotspots for tourism can be managed, it should first be established where they are. The primary aim of this research is therefore to accurately identify adventure hotspots in KwaZulu-Natal by using GIS technology. A further aim is to show how existing media and literature on responsible travel can be realigned for eventual implementation on a mobile GIS platform.

1.7.2 Objectives

Two research objectives (each with two components) were identified to address the research problem stated in Section 1.6.

The first component of Objective **1** is to identify adventure hotspots in the KZN province by using the functionalities of a GIS. The second component of Objective 1 is to validate the GIS findings through the use of a questionnaire directed at the tourism practitioners from TKZN.

The first component of Objective **two** is to establish information prompts relevant to adventure travel. The second component is to conceptualise and then to illustrate how the information prompts relevant to adventure travel hotspots, as well as appropriate responsible behaviour, can be adapted for eventual implementation in a mobile GIS environment.

1.8 Research design and methodology

In this section the plan or blueprint used to conduct the research is explained. The philosophical approach, the study area and methodological approach are also outlined.

1.8.1 Philosophical approach

The adventurer in terms of this study is a foreigner who originates from a developed country. His/her opportunity to have an adventure in a remote pristine hotspot only realised after many hours of pre-planning. Pre-planning involves disseminating information from a multitude of sources, such as websites and tourism service

providers, and preparing for the physical challenge by means of training and lessons relevant to the adventure activity.

Postmodernism is suitable to study this type of individual, since it constitutes a complexity of ideas about both the nature of contemporary Western society and appropriate ways of thinking about and studying that very society (Flowerdew & Martin, 1999:27). In the philosophy of postmodernism, the traveller is seen as a unique individual concerned with developing his/her personalised attitude towards knowledge, theories and communication methods (Peet, 1998:209). From this perspective, the researcher will attempt to find out how the adventurer interprets information. The premise here is that people think about what they do and act on the basis of interpreted thought (Kitchin & Tate, 2000:16)

Boniface (2001:47) suggests that 21st century postmodern travellers can be referred to as ‘dynamic travellers’ and ‘neo-nomads’ since they make their own choices and decisions. Many modern travellers are immersed in their materialistic existence centred on technology. Boniface (2001:10) suggests that the neo-nomads are bored with their oversaturated way of life and opt for a simpler existence. This yearning for a simpler existence results in the ‘dynamic traveller’ who wants to travel light by leaving no footprint. He/she is also aware of the negatives and positives regarding their actions at the destination. The neo-nomad further shows a propensity towards freedom of choice. However, for neo-nomads to travel light they need reliable information that they can understand and use according to their desires. Boniface (2001:13) states that the accessibility of large amounts of data is essential to this travel style. The ease of which this information is available may have resulted in the dawning of the neo-nomad or dynamic traveller. Guelke (2003) suggests that the postmodern individual is in control of the information he/she uses, and it is this postmodern thinker who makes decisions based on his/her personal interests and how best to secure it (Guelke, 2003:105–107).

Harvey (1989, as cited by Johnston & Sidway, 2004:276), in his model on the shrinking world illustrates the exponential advancements in technological accomplishments, and discusses how the user controls and absorbs the flow of information. This is relevant to an adventurer who is inundated with masses of

information and technology. Yet, amidst the labyrinth of information and technology, he/she still manages to use the knowledge and find his/her way to the ideal adventure destination. Soja (1996:1-3) refers to the postmodern individuals as having the ability to “steer, select and organise ideas based on their expectations”. Boniface (2001:43) goes further and states that the postmodern traveller embraces the accessible and relevant information with an open mind and makes his/her own decision with regard to what is useful and relevant and what not. This approach will ensure that the optimal choice is made at the optimal time.

Swartbrooke et al. (2003:9) suggest that the adventurer is characterised by spontaneous decisions and becomes an unpredictable entity once at the destination. His/her attitude about a place may change dramatically once at the destination. The postmodern adventurer is a unique person with an open mind and a carefree spirit. There is no one answer for this type of traveller; no discourse is greater or more dominant than the next, and no one’s voice should be excluded from dialogue. The postmodern adventurer goes as far as challenging normal societal practises (Kitchin & Tate, 2000:16).

1.8.2 Methodology

Research in tourism is generally a cross-disciplinary approach, as tourism is not an academic discipline as such. Rather the study of tourism borrows from several different disciplines including geography, sociology, psychology, history, politics, and economics. It is therefore important to acknowledge that no single method is necessarily best (Smith, 1995:1-17). This research has two main objectives, and specific processes were applied to achieve the research objectives. The processes will be briefly explained in this section.

Identifying adventure hotspots (component 1 of Objective 1) was achieved by using the functionalities of a GIS. The first step was to define a hotspot in the context of this research. The definition has its origin in observations made during travels, literature, and perceptions of the KZN tourism practitioners. Swartbrooke et al. (2003:13) suggests that the adventurer enters into ‘explore-mode’ at the destination and is destined to venture into the surroundings. The study therefore chose to regard an area as a ‘hotspot’ as opposed to an exact point on earth. The key elements that

constitute a hotspot are: remoteness, traditional culture, nature, wilderness, unspoilt, exotic, nature-based and undisturbed. The next step in the process was to choose a suitable GIS methodology that could spatially locate the key elements mentioned. This study modelled reality by using a grid of equal-sized vectorised cells. This approach mimicked a more traditional raster grid method, which uses imagery data. However, since the data for this study were all in vector format, it effectively means that it was a vectorised grid approach. The grid cells served as a spatial framework of areas to be evaluated. The evaluation involved spatially locating those vector grid cells that had a high concentration of natural resources and no presence of human features, thus accentuating the research definition of an adventure hotspot.

A questionnaire was used to obtain information from the practitioners in the latter part of 2009. The purpose of the questionnaire survey was, firstly, to validate the GIS methodology that has been used to identify adventure hotspots. Secondly, the survey aimed to ascertain perceptions regarding sustainable planning at the identified hotspots (component 2 of Objective 1). Twelve tourism practitioners (see Section 3.42 for detail on how these practitioners were selected), representing all the TKZN tourist regions, each completed a questionnaire consisting of a mixture of quantitative and qualitative questions. The first five interviews were held in KZN and were conducted face–to-face. The remaining seven interviews were conducted telephonically. The same process was followed for both the face-to-face and telephonic interviews. The main steps taken in the process are summarised below.

- A phone conversation was held with the respondent during which a meeting time and location were confirmed.
- Prior to the start of the meeting, permission was requested to record the interview.
- Each interview started with a brief introduction to the research problem and the researcher's personal motivation for doing the research.
- The chronology of the applied GIS analysis was then explained by using a flow chart (see Appendix 2).

With regard to the second objective of the study, the method chosen to establish a list of appropriate information prompts (component 1 of Objective 2) was to gather the data relevant to the responsible behaviour at the tourist destination. The next

step was to organise the data which was guided by Jamieson (2006). Jamieson (2006:93) asks a series of questions. Firstly, what are the resources, theme and sub-theme to be interpreted? Secondly, why are these resources and themes being presented to a tourist and what should the presentation accomplish? Thirdly, who are the visitors to the community? How can the visitors be understood in the context of the presentation of information? The following steps are not directly related to the methodology but are useful in creating a well-balanced list that will work in a real-life situation. Firstly, how, when and where are the interpretive programme and service presented? Secondly, what will it cost, in terms of people, time, resources and budget, to implement the plan? Thirdly, how will the parts of the plan be evaluated to see whether all the objectives are achieved? These guidelines, in the form of questions, guided the researcher to structuring the list of information prompts for the adventurer.

The next step was to conceptualise and illustrate how relevant information about adventure travel hotspots and desired responsible behaviour can be adapted for eventual implementation in a mobile GIS environment (addressing component 2 of Objective 2). The method adopted to achieve this objective was firstly to identify the key adventure traits. The next step was to identify key technology models applicable to the mobile GIS environment. Models such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Technology Acceptance Model for Mobile (TAMM) (Kaasinen, in Lumsden 2008: 102-118) added to the overall knowledge in terms of the technical aspects that a typical mobile user may well consider. These models guided the selection of information sources that would appeal to the typical mobile user. The next step was to link existing mobile applications to the adventure trait and theoretical guidelines. A set of scenario maps were used to illustrate how it could work in a mobile GIS environment.

1.8.2.1 Data collection

To achieve the first component of Objective 1 of the research, spatial data were required for analysis in a GIS. The results were dependent on accurate and relevant spatial data. The data were sourced from the Department of Environmental Affairs

and Tourism (DEAT), private industry and from hard copy map books. Table 1.6 provides a listing of the sourced data and some characteristics thereof.

Table 1.6: Data sources used for the research

Source	Name of feature	Datum	Coordinate system	Type of feature
DEAT – ENPAT* (2001) Files were received in Shape file format.	Built-up areas	WGS84	Lat/long	Area
	Architecture			Point
	Wetlands			Area
	Perennial water bodies			Area
	Rivers			Line
	Fauna and flora sites			Point
	Geological areas			Point
	Rocky beach			Area
	Sandy beach			Area
	Pebble beach			Area
	Low mountain			Area
	High mountain			Area
	National heritage sites			Area
	Conservation areas			Point
AfriGIS – 2008 Files were received in Shape file format.	Accommodation			Point
	Streets			Line
Mapstudio – 2008 A hard copy map book	Waterfalls			Point
	Caves			Point

* Environmental Potential Atlas

The second component of the first objective was to validate the GIS findings through the use of a questionnaire completed by respondents who represented all the tourism regions in KZN. Communication with the TKZN information systems manager led to a formal agreement that allowed the researcher access to the PTF members during the latter parts of 2009. Telephone calls were made to the most senior PTF members from each region. This can be referred to as a purposive sampling method. There were 12 respondents that covered all tourism regions. Four respondents had working experience in the entire province. The remaining eight each represented one of the eight TKZN tourism regions.

In relation to the second objective, the first component was to establish information relating to adventure activity. The output is a list of tables that can, in a real-life situation, be linked to a GIS through a column with a spatial identifier. This proved to be a challenge, since there is a labyrinth of information available relating to the context of 'responsible' travel. It was also imperative to ensure that the data collected was relevant to the context of the study. For the purposes of the study, data were gathered from world tourism organisations, the worldwide web (WWW), books, articles and brochures. A combination of sources was used to conceptualise a mobile GIS framework for the adventurer (the second component of the second objective). These sources were the output maps from the identification-of-hotspots process, information from the tables of information prompts, existing mobile application characteristics and applicable theoretical framework guidelines.

1.8.2.2 Data analysis

Modern day geographers have a multitude of methods available to do spatial analysis. This research proposed to adopt sound methods to analyse the data in an efficient and effective manner. Flowerdew & Martin (1999:157) states that the main objective of data analysis in a GIS is to "summarise large amounts of data through descriptive statistics, explore data through visualisation techniques and develop models of the real world."

The spatial data used to identify adventure hotspots were grouped into human-cultural data and natural data. Structured Query Language (SQL) was used to query the data groups in order to identify the grid cells where adventure is most likely to occur.

To validate the GIS findings, the TKZN practitioners completed a questionnaire (see Appendix 1). The questionnaire was structured around three broad categories: firstly, the background information of respondents was evaluated; secondly, the results of the validation of the research methodology were assessed; lastly, the respondents' opinions were evaluated in relation to planning for sustainable tourism at identified hotspots.

Establishing a list of information prompts relevant to adventure travel was achieved by populating a set of categorised tables. The categories were the outcome of the guidelines suggested by Jamieson (2006:93). Each category has relevance in different environments and situations. The categories are: contact number or contact websites, WWW information on association and other useful information (category 1); the well-being of an adventurer (category 2); responsible treatment of the traditional-cultural environment (category 3); and responsible treatment of the natural environment (category 4).

This research did not collate information prompts for every single adventure-related feature. Information prompts (based on personal experiences as well as recommendations from the respondents and existing TKZN material on responsible travelling) were developed for a number of possible scenarios. The interpretation of the framework criteria followed a series of steps. A set approach was adopted for each criterion. The adventure trait was identified first, followed by related elements of the technology models, and lastly existing mobile applications that can be used as a benchmark. The framework criterion for the mobile GIS is explained by referring to maps. Maps were used to describe the possible 'travel' scenarios for the adventurer in the KZN province. These maps illustrated the movement of the traveller and possible interaction between the traveller and selected features.

1.9 Organisation of thesis

Chapter 1 began with a review of the importance of geography with regard to tourism research. The chapter then contained explanations of important terminology applicable to the research. This was followed by a look at the South African tourism sector, which was done by firstly reviewing the factors impacting on the tourism sector and secondly the management of the South African tourism sector. The chapter then reviewed the tourism sector in KZN. Firstly, the growth and trends of the KZN tourism sector were examined, followed by a discussion about adventure tourism in the province. The review on KZN tourism was concluded with a discussion about the term 'hotspots' used in the research. The chapter subsequently discussed the reasons that motivated the researcher to attempt the research. This was followed by a statement of the research problem, after which the aims and objectives were

addressed. Finally the research design, philosophical approach, methodological approach, data needs and methods of analysis were discussed.

Chapter 2 contains a review of the literature pertinent to this study. The chapter firstly covers the discussion on adventure tourism. The growth of the adventure sector, the characteristics of a typical adventurer and the adventure destination are discussed. Important definitions of adventure are also reviewed. The section concludes with a discussion on adventure tourism in South Africa. The dynamics of the tourist and the tourist destination is then discussed. Firstly, the views of the tourists are discussed, followed by the view of the locals. The section concludes with a discussion on the life cycle of the destination. The last section of the literature chapter reviews management and information systems. Perspectives of the authorities are discussed by delving deeper into the rationale for responsible management, followed by a review of how information systems can be used as a tool for decision making. The perspectives of the adventurer are discussed in the section on management and information systems. Firstly, conventional information needs are discussed, followed by a discussion of the information required for responsible travel. This is followed by a review on the information required for responsible travel. Lastly, the chapter concludes with a discussion about how the information is communicated to the traveller.

In Chapter 3, the details of the methodology and results of the identification of adventure hotspots are reviewed (Objective 1). The chapter begins with the definition of an adventure hotspot and the data requirements for identifying adventure hotspots using a GIS. The steps needed to achieve the objective of locating adventure hotspots are reviewed. This is followed by a detailed discussion of the analysis and interpretation of the data pertaining to the identification of adventure hotspots. A discussion about the validation of the hotspot identification process (component 2 of Objective 1) follows. The questionnaire survey is interpreted by firstly reviewing the background of the respondents. Secondly, the perceptions of the respondents regarding the research methodology and spatial patterns revealed by the output hotspot map are interpreted. Lastly, it seeks to understand the respondents' opinions on planning for sustainable tourism at identified hotspots.

In Chapter 4, the methodology used for the analysis of the data is discussed. The results from the analysis are interpreted for the study's second objective, which is to conceptualise and illustrate how relevant information about adventure travel hotspots and desired responsible behaviour can be adapted for eventual implementation in a mobile GIS environment. The first component of Objective 2 is to establish information prompts for the adventurer. This is achieved by looking at the data needed to formulate the information prompts. Subsequently the guidelines necessary to create the information prompts will be addressed. The collated information prompts are then presented. A number of categories are used to illustrate a few relevant scenarios. The chapter also includes an examination of the conceptual framework for a mobile GIS that could appeal to the adventure traveller. This will be achieved by firstly reviewing existing mobile applications that are relevant to the research, followed by applicable framework models needed to design a mobile GIS framework. A table is used to link an adventure trait to an applicable mobile GIS framework guideline. The conceptual framework criteria that are in line with the adventure trait, existing theoretical models and existing mobile applications are interpreted. A series of maps were created to illustrate typical scenarios of how the individual criterion would work in a real-life mobile GIS environment.

In Chapter 5, the findings and recommendations are offered. Achieving the research outcomes are discussed in detail in the first part of the chapter. The potential value of the research is then summarised. Proposals for improving some old strategies regarding the development of tourism businesses and ways of thinking about the tourism resources in KZN are discussed. The limitations of the study are also reviewed. The chapter concludes with recommendations for further studies.

1.10 Conclusion

This chapter provided an introduction to tourism studies in geography and tourism in South Africa, and KZN in particular. Relatively little research has been done on adventure tourism in KZN, which led to the problem statement, aims and objectives of the research. The methodological and analysis techniques adopted in this research addressed the following objectives: identifying the location of adventure hotspots in KZN, verification of the spatial distribution of identified hotspots using a

questionnaire survey (completed by KZN tourism practitioners), creating useful information prompts relating to adventure activity and, lastly, a conceptual framework for a mobile GIS. The chapter concluded with the structure of the thesis.

The next chapter attempts to broaden the understanding of the theoretical and conceptual perspectives of the literature applicable to the research. The focus is on adventure tourism, the dynamics of the tourist and the tourist destination and finally information systems and its potential value to decision makers and to the adventure traveller.

Chapter 2: Perspectives from the literature

2.1 Introduction

In this chapter, the first area of focus is the adventure tourism sector (2.2). The growth of the sector is discussed (2.2.1), followed by the characteristics of the individual (2.2.2) and the destination (2.2.3). The more important definitions of adventure tourism (2.2.4) are then examined. The section on adventure tourism is concluded by a review of the research done on adventure tourism in South Africa. In Section 2.3, the interaction between the tourist and the tourist destination is reviewed. Applicable theories relating to the tourists (2.3.1), locals (2.3.2) and tourist destination (2.3.3) are reviewed. In Section 2.4, the perspectives of the authorities in relation to the need for responsible management are discussed (2.4.1). The researcher then attempts to deepen the understanding of tourism management (2.4.2) regarding the value of information systems. This is followed by a synopsis of the information needs of the adventure traveller (2.5), what information exists (2.5.1), what information would be required for responsible travel (2.5.2) and how the information can be communicated (2.5.3).

2.2 Adventure tourism

2.2.1 The growth of the adventure sector

Epic adventure stories, such as The Famous Five by Enid Blyton and blockbuster hits such as the movie Indiana Jones and the Temple of Doom, are just some of the more classic stories that inspired the growth of the adventure tourism industry (Swartbrooke et al., 2003:8). Adventure tourism is the fastest growing segment in the tourism industry (Loverseed, 1997; Hall, 1989; Sung et al., 1997; Tourism Canada, 1995, as cited by Sung, 2000:49; Callander & Page, 2003 and Ewert & Jamieson, as cited by Schott, 2007). Rogerson (2007), Cater (2006) and Xie & Schneider (2004), validated the trend by researching the period 1997 to 2007. The results revealed that adventure tourism is the fastest expanding sector of global tourism. A study done by The United Nations World Tourism Organisation (UNWTO), in collaboration with Millington, Locke & Locke (2001), revealed that the international adventure tourism market amounted to between 4 and 5 million trips in 2000. Studies done by Smith &

Jenner (1999) suggest that, on the international scene, the adventurer still prefers the North American and European regions.

Millington et al. (2001) proposed that the potential international market, for even a limited view of adventure tourism, is around 60 million or 14% of all international trips for the year 2000. According to Millington et al. (2001) and the United Nations World Tourism Organisation (UNWTO, 1997), this figure of 60 million is made up of skiers, scuba divers, surfers and nature-based tourism. A more recent estimation of the adventure tourism economy by Williams & Soutar (2009) and Buckley (2010) is that it is currently at US $1 trillion. During the latter parts of the 20th century, most of the adventure definitions were primarily focused on sport and nature tourism and less on cultural tourism. (The vagueness that surrounds the definitions of adventure tourism will be discussed in Section 2.2.4). Researchers such as Sorenson (1993), Edgell (1996), Higgins (1996), Tisdell (1996), Wight (1996), Loverseed (1997) and Sung et al. (1997), identified that there has been a steady rise since the early 90s with regard to special interest tourism products, specifically ecotourism, nature tourism and adventure tourism (cited by Sung, 2000:49). Another growing trend since the late 90s is the interest in many less developed regions of the world where there is a high concentration of natural features and unique local culture (Hall, 1989 & Bar-on, Pizam & Crotts, 1997).

Swartbrooke et al. (2003) suggests that adventure tourism is the new tourism discipline; a transition from an old form of tourism to a new form of tourism. The growth in the adventure sector is related to how human beings are living their day-to-day lives. According to John Muir (1901, as cited by Wilks & Page, 2003:67), many people are exhausted and become overly civilised in their day-to-day lives. A report on the 2020 tourism vision (Mintel 2000) suggests that society is generally becoming more divided, and individualistic. This reality is instilling a sense of longing for the mountains, parks and nature reserves. The wilderness or great outdoors has abundant natural life and provides an experience that is necessary to create a sense of peace in the individual. Cohen (1979) proposes that the individual lives two realities. The one reality is everyday life with its deep layers of meaning, and the other a world of the “elective centre to which they will depart on periodical pilgrimages to derive spiritual sustenance” (Cohen, 1979:101).

Buckley (2006:1-4) suggests that the birth of adventure tourism as a recognised type of tourism could be due to a number of inter-related factors. More disposable income, but less spare time away from work, could have lead to a need for short adventure thrills in an environment that takes the traveller far away from his/her normal working environment. The second probable factor could be the ease with which a person can travel, especially by air. Between 1948 and the present, aircraft cruising speed has risen from 692 to 2182 kilometres per hour. The maximum aircraft capacity increased from 40 to over 400 passengers. The rise in tourism around the world could be, in part, related to the increases in speed capacity and the frequency of modern travel (Cossar, in Wilks & Page, 2003:21). This results in distant exotic destinations becoming accessible, leading to growth in tourism. The third probable factor could be the availability of adventure equipment and readily available training courses before and during the adventure.

Egmond (2007:75) and Swartbrooke et al. (2003:271) suggest that adventurers are showing signs of wanting to experience their own personal adventure. They affirm that it is crucial to ascertain how much of an element of adventure still exists in their pre-planned trips. Trends show that more people currently travel on their own, seeking solo experiences away from or not under the care and control of tour operators. Growing numbers of these solo adventurers are eager to interact with the local indigenous cultures of the host destination. This trend is resulting in a rise in adventurers heading to developing countries because it is where traditional cultures of the world are still found. These solo escapades concern tourism authorities, as the safety of the adventurer is precarious in contexts where the indigenous population do not fully understand the need to ensure the adventurers' well-being and the guest does not understand the context of the host destination (Egmond, 2007:75).

Adventure tourism distinguishes itself from normal tourism on five counts. Firstly, there is a degree of readiness or preparedness on the part of the individual. This involves certifications, trip planning and the organising of skilled personnel to undertake the adventure. Secondly, adventure tourism is more expensive because of the costs surrounding the training and renting or buying of equipment. The third distinction is that adventure tourism requires planning when entering remote areas

that are not usually visited by the average tourist. Fourthly, an adventure activity, such as skiing on a mountain or surfing on the beach, depends on seasonal weather cycles. Fifthly, the professional adventure tour suppliers are required to employ experienced and certified adventure guides (Swartbrooke, et al., 2003).

Swartbrooke et al. (2003:170), Wilks & Page (2003) and Sung (2000) reviewed the general trends in the adventure sector in the developed world context. Demographic trends show a peak and subsequent decline in the population growth rates of developed and post-industrial countries. More single women are having fewer children, at an older age, resulting in a change in the family and household structure. Socio-economic trends include a decrease in the retirement age and more disposable time due to flexi-time working hours and long weekends. This results in people having more time to spend on adventure activities for longer and for travelling further away. There is a changing attitude towards ageing that is in part due to better health care. This changing attitude towards ageing resulted in people reaching professional status at a younger age, enabling some to travel at an earlier age also. Better access to education affords travellers the opportunity to educate themselves, obtain better or more lucrative employment, thus resulting in more disposable income for adventure holidays. Travelling is seen as a 'fashion accessory' and a strong media pulling card. For example, there are dedicated travel channels and ESPN's extreme sports 24-hour satellite channel. Another trend noted is that people are more independent in an increasingly consumerist society. However, with the dawn of the 21st century, more people are expected to become distant from or disillusioned with materialism (Mintel, 2000). Health and fitness are linked to outdoor activities that are seen to effectively instil a sense of well-being. Contact with nature is seen to improve the health and fitness of the individual.

The Internet made a substantial impact on the emerging tourism industry, since "more sophisticated data handling systems will enable businesses to target micro markets" (Swartbrooke et al., 2003:254). Technology has also had a positive impact on the expansion of the transport industry. This trend has enabled cheaper, more readily available transportation systems, which will allow adventurers to travel to more remote destinations at a lower cost.

The last trend in the adventure tourism sector refers to politics. Firstly, on the political front, some industrialised nations are moving into post-industrialisation where the economy “is more dependent on service, technological and knowledge-based industries” (Swartbrooke et al., 2003:254). Developing countries have picked up the manufacturing and production role that industrialised countries lost. Some destinations in the developing countries are, however, not developed because of safety or instability in those nations.

Some special areas are emerging in adventure tourism. An interesting area of growth in the wildlife tourism sector is that of plant adventures. Botanical scientists are just beginning to harness the potential that lies in flora species (Swartbrooke et al., 2003). An offshoot of this is ‘smelling adventures’, where adventurers capture the essence of certain plants to sell to companies that make perfumes and scented paraphernalia.

Swartbrooke et al. (2003:) further note that new forms of adventure tourism will probably emerge over the next few years, such as space tourism, travelling to the poles and even underwater sea resorts. However, it is apparent new forms of adventure tourism will emerge that cannot yet be predicted.

2.2.2 Characteristics of the adventurer

Egmond (2007) concludes that human beings are naturally driven to seek out optimal arousal. Berlyne (1960, as cited by Egmond, 2007:55) suggests a balance between novelty and familiarity. This is a biological and physiological occurrence of each human being. Too much unpredictability can lead to stress and feelings of complete lack of control whereas too much predictability leads to ennui or boredom. A balance between these two extremes is required for an optimal and enjoyable experience. Berlyne (1960, as cited by Egmond, 2007:55) further notes that “we are indifferent to things that are either too remote from our experience or too familiar but noted humans are learning continuously”.

The reality for many people who live in a developed country is that they “experience an avalanche of over 1000 consumptive advertising stimuli every day from television, radio, notices, packaging, street advertising and so on” (Swartbrooke et al.,

2003:221). The thought of escaping to the ‘outdoors’ sparks up words like nature, earth and the environment. Being in the ‘outdoors’ stimulates the brain in different ways.

Kellert (1993, as cited by Swartbrooke et al., 2003:219) concludes that spending time in green spaces results in a number of physiological responses: “*reduced heart rate, reduced blood pressure, a decrease in circulating stress hormones, an increase in cognitive functioning, performance and creativity, alterations in brain activity in the alpha frequency, relaxation of stress-induced muscle tension*”. Studies by Beard & Wilson (2002, as cited by Swartbrooke et al., 2003: 218-222) showed the relation between wilderness and transcendental forces that host restorative healing powers in the experience of the wilderness. Furthermore, to gain an understanding of the adventurer tourism sector, nature must be enjoyed and absorbed as a curative force.

Zuckerman (1979:13) proposes that the need for brain stimulation is related to a type of ‘sensation seeking’. On account of this, he devised the sensation seeking scale (SSS). This scale is a 40-item questionnaire that tests people’s risk-taking behaviour in a variety of situations. Taking risks is an important part of the make-up of the typical adventurer, and will be discussed in more detail further in this subsection. Sensation seeking and the need to partake in adrenalin-rushing activities are more part of an adventurer’s personality character make-up than in other types of tourists. This is typically characterised by a ‘feel good’, ‘pumped up’ feeling (Schueller, 2000:21). In reference to the Catastrophe theory, the release of adrenalin assists with sporting tasks. Strength and mental precision can be harnessed, since “certain neurotransmitters, such as adrenaline, endomorphines and dopamine, are responsible for the ‘feel-good’ factor experienced by everyone, at different degrees of intensity” (Fox, 2000:39). *S*chueller (2000) concludes that an exciting or risky situation can trigger an increased flow of adrenaline, endomorphines and dopamine. Adrenaline, for example, results in a rush of energy and alertness. Another ‘feel-good’ enzyme released is Monoamine Oxidase type B (MAO B). This enzyme regulates the functioning and amount of these ‘feel-good’ chemicals in the brain (Fox 2000:39).

A further feature of the typical adventurer is the flow factor. Csikszentmihalyi (1992: 62) defines flow as "the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it at great cost, for the sheer sake of doing it". The 'flow' feeling can also be related to the feelings of 'oneness' with the surroundings and a loss of the sense of 'self' (Csikszentmihalyi, 1992:62). Csikszentmihalyi (1992) further likens this oneness to a 'Zen' feeling; an intense feeling of peace. This oneness culminates in the sensation of flow. A flow experience is attained by being involved in activity-demanding situations such as "scuba diving, mountain biking, sea kayaking and other adventure sports" (Csikszentmihalyi, 1992:3). Revelling in a state of 'flow' is precisely the peak exhilaration the adventurer seeks, which results in a life-time memory that the adventurer can always cherish. The basic need for sensation and flow is all part and parcel of the typical adventurer's profile. Sung, Morrison & O'Leary (1997) propose that this has strong roots in the adventurers' basic requirements, which are to enhance their self-esteem, to become more competent in certain activities, to face challenges head on, to develop new skills and to experience novel situations.

The typical expectations of the adventurer are a combination of "*uncertain risks, danger and risk, challenge, anticipated rewards, novelty, stimulation and excitement, escapism and separation, exploration and discovery, absorption and focus and contrasting emotions*" (Swartbrooke et al., 2003:17). When choosing an adventure activity, the individual will adjust according to "the degree of remoteness, the levels of skills required, the levels of effort required, the opportunity for responsibility and lastly the level of contrivance" (Swartbrooke et al., 2003:17). Researchers Chon & Sing (1995), Cohen & Richardson (1995), Weiler & Hall (1992), Morrison et al. (1996), Oden (1995), Pearce & Wilson (1995) and Sung et al. (1999) (as cited by Sung, 2000:85), propose that adventurers can be summed up as a "more affluent, environmentally-concerned, and highly experience orientated group of people who seek specific experiences strongly engaged in various activity and participation."

As discussed in Section 2.2.1, with the comforts and luxuries gathered by the typical individual in a developed country, they are less likely to be at physical risk in their day-to-day routines. This is true for both males and females alike, and "especially those engaged in more cerebral occupations" (Ryan, 2003, in Wilks & Page,

2003:58). These individuals are more likely to want to experience an adventure holiday. The experience of risk is something most people want to live through, in varying degrees and contexts. Research by Chang et al. (2001, as cited by Wilks & Page, 2003:60) suggests that there is a connection between boredom and risk taking. Bentley et al., (2000) proposes that as humans endeavour to maintain their health, there is a natural tendency to engage in physical activity that may, by its very nature, result in risky situations such as falling over and suffering bruising, cuts and sprains. The work of Gibson (1996 as cited by Wilks & Page, 2003:58) also identified a relation between thrill seeking and life stages. He noted that younger adults, with certain personalities, were more likely to involve themselves in risk taking. This can be defined as the "exercise of choice and the tourist consumer is choosing to accept a risk in order to gain benefit". It also implies that the tourist assumes that the benefits or risk-taking outweighs the risk of loss. The suppliers of adventure tourism are tasked with creating an equilibrium between exposing the client to risk and managing risk. The main objective of the adventure tourism supplier is to prevent the adventurer from having an accident (Swartbrooke et al., 2003). The definition of an accident is "anything that happens without foresight or expectation; an unusual event which proceeds from some unknown cause, or is an unusual effect of a known cause" (Dictionary.com, 2009a).

Ewert & Jamieson (in Wilks & Page, 2003:72) state that the primary characteristic that differentiates adventure travellers from other travellers is the pursuit of solitude, achievement, challenge and risk. However, it is important to remember that the adventurer will, in all probability, visit restaurants, spend time at attractions, amusement parks, lodging and local performances, which are also part of a normal tourist experience. This normally happens during the build-up to or after the adventure activity. From a more practical perspective, the adventurer will be tasked with planning for a successful experience. In preparation for the experience, the adventure traveller portrays traits of other types of tourists, since he/she would purchase or invest in items such as proper clothing, first aid equipment, contact information, a travel itinerary and other similar logistics. A practical characteristic of the typical adventurer is the environmental awareness, which includes the need to 'leave no trace'. The adventurer would need to educate him-/herself in certain aspects such as "*packing in and packing out everything brought in, maintaining*

hydration, handling water issues, dealing with indigenous animals, handling unique medical conditions brought on by exertion, altitude, heat and cold weather conditions, storms, floods and other natural occurrences, and managing a natural environment" (Ewert & Jamieson, in Wilks & Page, 2003:70-72). What makes the experience exciting is the unexpected. Swartbrooke et al. (2003:219) state that it is easy to plan ahead, "but it is very different when tourists are on the slopes, with the adrenaline pulsing through their veins".

The adventure experience can be summarised as one that "can be one of the greatest accomplishments one makes and the singularity of the experience can be life changing if these are met" (Ewert & Jamieson, in Wilks & Page, 2003:73).

2.2.3 Characteristics of the adventure destinations

Adventure travel destinations were historically associated with the unexpected, danger and risk. The earliest empires, such as Egypt, Assyria and Babylonia, improved roads for military purposes that aided in the creation of recreational tourism routes. These routes, however, were for the strongest and most daring of recreational consumers. It was only in the 19th century, when Thomas Cook organised his first tours that adventure tourism blossomed as a significant sector. Back in the 19th century, Thomas Cook's infamous adventure experiences were in the Swiss Alps, the Nile River, Mount Everest, India and Yellowstone Park. These experiences were made possible because there was some degree of infrastructure, such as highways and roads, leading to the adventure activity. This is more so for adventure tourism as accessibility to the often remote areas is a significant factor in the decision to travel (Ewert & Jamieson, in Wilks & Page, 2003:70).

Swartbrooke et al. (2003:217) propose that adventure destinations, especially the natural environments, are in a hierarchy of importance for the adventurer, with code 1 being the most important and code 9 the least important (see Figure 2.1A). Often the destination becomes an adventure hotspot because of the species found in it. The Elton Pyramid (Colinvaux 1980, as cited by Swartbrooke et al., 2003: 212) shows the living species popularity which also appeals to the adventurer, Figure 2.1B below is a representation of the Elton Pyramid, with code 1 being the most important and code 9 the least important.

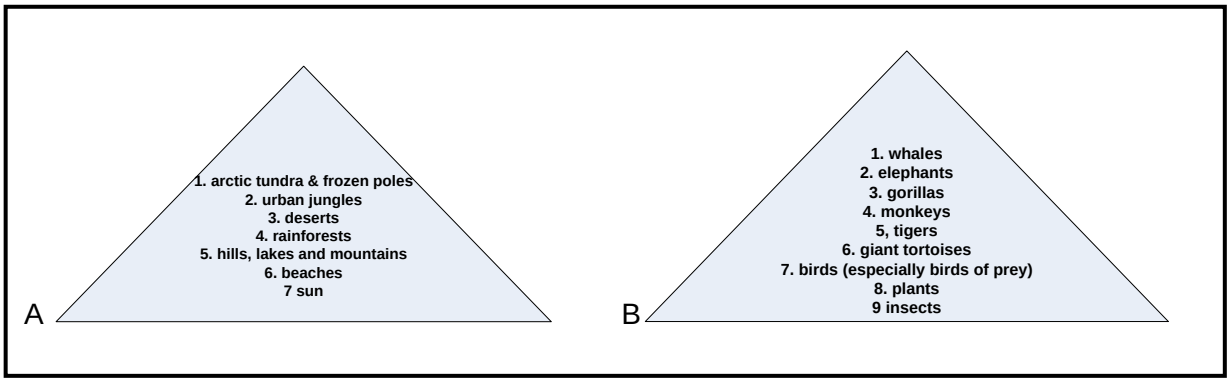


Figure 2.1: Adventure tourism hierarchy of importance – natural environment and living species

Africa's wildlife is its most impressive tourism attraction. Shackley (1996) and Schanzel & McIntosh (2000) focus on the importance of wildlife tourism. The predominant location for wildlife tourism experiences are generally in developing countries. If the destination has the presence of the big five, which are made up of the elephant, rhino, buffalo, lion and leopard, it is likely to be an adventure tourist destination. Buckley (2010) proposes that elephant safaris, gorilla hikes, walking with lions, swimming with dolphins are part of the 'wildlife adventure tourism economy.

According to Swartbrooke et al. (2003), the most popular types of accommodation for adventure tourism are sleeping rough, in the open, camping, youth and other hostels, mountain huts and refugee camps for tourists. The typical adventurer's place of rest is determined by the type of activity found at the destination. Adventure tourism destinations can be typified by hard and soft adventure activities. Soft adventure is characterised by activity with low levels of risk. A hard adventure activity requires more commitment. With hard adventure activities, there is a bigger chance of danger or risk. The typical adventure tourism categories are given in Table 2.1. These categories draw a distinction between the 'harder' and the 'softer' types of adventure activity.

Swartbrooke et al. (2003:30) are of the opinion that a new classification of the typical adventure tourism destination will consist of artificial environments, urban exploration, charity challenges, conservation expeditions, hedonistic tourism,

spiritual enlightenment, virtual reality, sex tourism and round-the-world travel. An adventure destination also involves non-physical tourism.

Table 2.1: Hard and soft adventure activities (Ewert & Jamieson, in Wilks & Page, 2003: 69; TIA categories as cited by Sung, 2000:82; Villalobos-Céspedes, et al., 2010; Buckley, 2010 & Lawrey, 2010)

Hard activities	**Soft activities**	**Source**
Rock and mountain climbing	Camping	Ewert & Jamieson, in Wilks & Page, 2003
Snorkelling and scuba diving	Biking	
Caving	Flat-water canoeing	
White-water boating	Photo safaris	
Wilderness backpacking	Day-hiking	
Backpacking across rugged terrain	Bird watching or animal watching	TIA categories in Sung, 2000
Off-road biking or mountain biking	Sailing	
Hand-gliding, para-sailing or wind-surfing	Horseback riding	
Parachuting or sky-diving	Snow skiing	
Skateboarding or snow boarding	Water skiing	
Roller-hockey, bungee jumping or other extreme sport	Canoeing	
Spelunking or cave exploring	Visit a cattle or a dude ranch	
Survival games like paint ball	Wilderness tours in off-road vehicles	
Hot air ballooning	Safari to take photos	
River rafting	Hiking	Soft activities (Villalobos-Céspedes et al., 2010) Hard activities (Buckley, 2010 & Lawrey 2010
Skiing	Bird watching or nature watching	
Snowboarding	Visits to volcanoes	
Kayaking	Canopy tours	
Bungee jumping	Fishing	
Mountaineering		
Scuba diving		
Sky diving		
Ice climbing		
Horse riding		
Surfing		

2.2.4 Defining adventure tourism

An adventure for one person may be commonplace for another (Smith & Jenner, 1999). From a geographical perspective, adventure tourism is “best defined within the context in which it originates in” (Swartbrooke et al., 2003:28). Many researchers conclude that defining adventure tourism is an arduous task, mainly because the sector is still relatively new and yet to find its place in the already vast field of tourism. The growth of adventure tourism can be related to the shift from economic achievement to quality of life. This post-modern shift in way-of-life is, according to Egmond (2007), linked to the desire to escape from a cycle of mundane routine and to venture into the unknown to experience an adventure. Post-modern changes in tourism began in the 70s and 80s onwards, when “work versus leisure, everyday life versus holidays, home versus away, real versus fake, authentic versus inauthentic no longer apply as they once did” (Egmond, 2007:38).

Some researchers, such as Hudson (2003), propose that adventure tourism is a new form of tourism; however, this is not necessarily the case (Swartbrooke et al., 2003). Buckley (2006) suggests that adventure tourism comprises nature, eco and adventure tourism (NEAT). Fennel (1999) and Zurick (1992) propose that adventure tourism encompasses adventure, cultural and eco tourism (ACE tourism). There is a blur between nature tourism, ecotourism, adventure tourism, adventure travel, commercial expeditions, outdoor recreation and outdoor education (Buckley 2006; and Sung et al., 1996). This is reiterated by Hall (1992, as cited by Sung, 2000:48), who proposes that the themes of adventure tourism have a long illustrious past, having roots in most themes of tourism, but specifically in eco and nature tourism. Buckley (2006) also proposes that adventure tourism evolved from the broader categories of the more traditional outdoor and wilderness recreation during the 20th century. Figure 2.1 shows the overlapping relationship between nature tourism, ecotourism and adventure tourism.

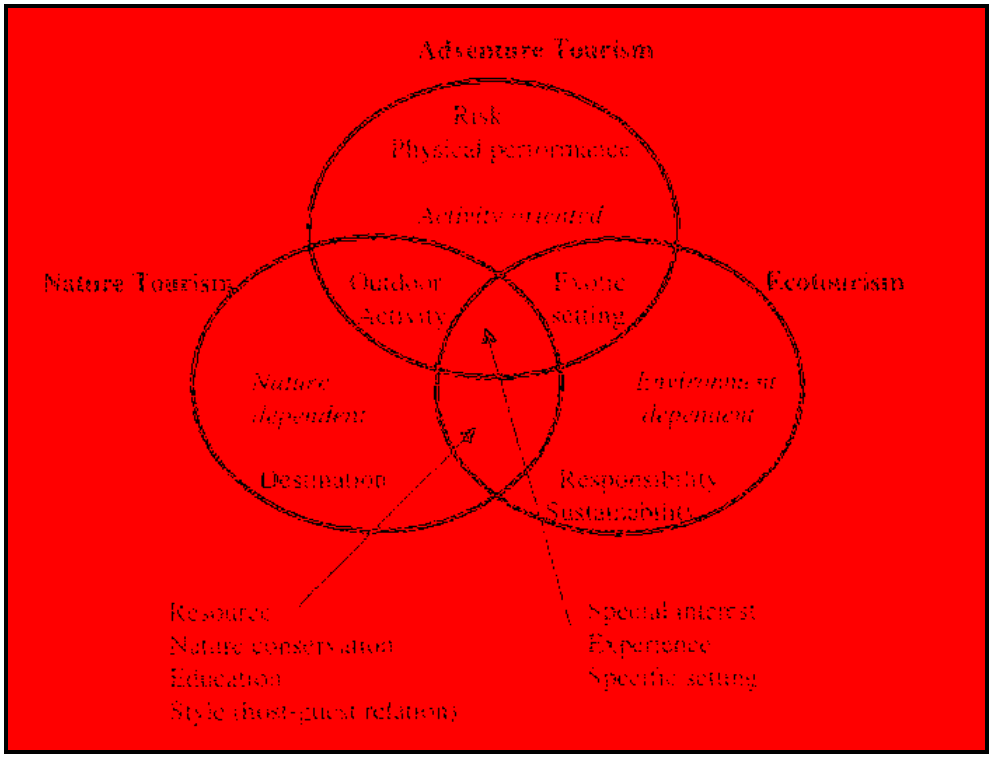


Figure 2.2: Relationship between nature, ecotourism and adventure tourism, (Sung, 2000: 45)

Ewert (1989) argues that adventure added another dimension of risk-taking and that adventure tourism involves partaking in an activity that attracts the travellers as participants. A connoisseur of tourism research, Buckley (2006), notes that the main adventure consists of high-volume, low-difficulty products for unskilled clients. Buckley (2006) focuses on the 'activity' element of adventure. He defines adventure tourism as "guided commercial tours where the principal attraction is an outdoor activity that relies on features of the natural terrain, generally requires specialised sporting or similar equipment and is exciting for the tour clients" (Buckley, 2006:1). The adventurer is tired of the over-populated tourist locations and in search of new thrills. He/she willingly ventures into under-used newly emerging locations with the intention of gaining an authentic experience. "*The adventure tourist is most likely to voluntarily put themselves in a position where they believe they are taking a step into the unknown, where they will face challenges, and where they will discover or gain something valuable from the experience"* (Swartbrooke et al., 2003:14).

Adventure tourism can further be defined as "a leisure activity that takes place in an unusual, exotic, and remote or wilderness destination. It tends to be associated with

high levels of activity by the participant, most of it outdoors" (Millington et al., 2001:65-66). Adventure travellers expect to experience various levels of risk, excitement and tranquillity, and to be personally tested. In particular, they are explorers of unspoilt, exotic parts of the planet; they also seek personal challenges. Adventure can also be defined as a "deliberate seeking of risk and the uncertainty of outcome" (Ryan, in Wilks & Page, 2003:55). Ewert et al. (2000) proposes a more elaborate, but similar, definition to that of Wilks & Page (2003). He proposes that an adventure is *"a self-initiated recreational activity typically involving a travel and overnight stay component that usually involves a close interaction with the natural environment, structurally contains elements of perceived or real risk and danger, and has an uncertain outcome that can be influenced by the participant and/or circumstances*" (Ewert et al., 2000:242).

Sung et al. (1997:66) suggest that the definition of adventure tourism is *"a trip or travel with the specific purpose of activity participation to explore a new experience, often involving perceived risk or controlled danger associated with personal challenge, in a natural environment or exotic outdoor setting"*. Swartbrooke et al. (2003) summarise the key constituents of adventure tourism as physically challenging, journeys to the remote, journeys to the exotic and journeys to the natural settings. The keywords of more renowned definitions of adventure tourism are summarised in Table 2.2. It is apparent that researchers from as far back as the 70's suggested that risk and physical danger constitutes adventure tourism which gives impetus to more recent definitions of adventure tourism.

Table 2.2: Keywords of adventure tourism

Source	**Keywords**	**Source**
Meir (1978)	exposure to physical danger	(as cited by Sung, 2000:20)
Darst & Armstrong (1980)	outdoor environment: air, water, hills, mountains	
Progen (1979)	challenge in the natural world: hills, air current and waves	
Yerkes (1985)	activity in natural environment where the outcome is unknown	
Johnston (1992)	travel for adventurous recreation	
Continued on next page		

Source	Keywords	Source
Ewert (1989)	elements of real danger	
Hall (1989)	outdoor activity with elements of risk	
Sung (1996)	natural environment with elements of risk influenced by the participant, setting and management of the tourist experience	
The Concise Oxford Dictionary (1999)	unusual, exciting	(as cited by Swartbrooke et al., 2003:28-29)
Priest (2001:112)	Uncertain	
McArthur (1989: 3)	freedom of choice, intrinsic reward, risks, unpredictable	
Smith & Jenner (1999:45)	remote, under-populated, traditional culture, extremely limited	
Canadian Tourism Commission (1995)	unusual, exotic, remote or wilderness	
Millington et al. (2001:67)	unusual, exotic, remote, wilderness	
Grant (2001: 167)	involves planning and preparation, dreaming of passion, excitement and fear	
Muller & Cleaver (2000:156)	high level of sensory stimulation, usually achieved by including physically challenging experiential components.	
Canadian Tourism Commission (1995); Fennel (1999: 49)	unusual, exotic, remote, wilderness, unconventional means of transportation	
Smith & Jenner (1999:44)	quality of exploration and expedition	
Addison (1999:416)	activity, nature, culture	
Sung et al. (1997:57)	natural environment, elements of risk	

Though the definitions above focus on the physical nature of an adventure, it is important to recognise that “an adventure can be of the non physical kind such as an activity that challenges the mind and spirit (Swartbrooke et al., 2003: 89). This is substantiated by a rather bold statement made by Welk (2004 as cited in Egmond, 2007:20). He states “*in the Bible prophets from Moses to Jesus experienced their spiritual enlightenment at remote, lonesome locations and always under ascetic conditions*”. Travellers from predominantly developed and Christian-based countries often relate their intrepid adventures as a spiritual experience that brings them closer to a sense of internal peace with themselves and there belief systems (Egmond, 2007).

2.2.5 Adventure tourism research in South Africa

As was stated in Section 2.1.1, adventure tourism has been recognised as one of the fastest growing travel market segments of international tourism. Although it is one of the fastest growing, it is also one of the least understood forms of international

tourism (Zurick, 1992; Xie & Schneider, 2004). This is also the case in South Africa, where little research has been done on the adventure tourism sector (Visser & Rogerson, 2004). Although there has been little formal research done, regular information is however provided by magazines such as Getaway adventure guide (Getaway, 2011) and websites such as South African Tourism (SAT, 2011b) and Dirty Boots (Dirty Boots, 2011), among many others. Kotzé (2004) further suggests that adventure tourism is promoted by several provincial authorities by means of their tourism websites. Research by Visser & Hoogendoorn (2011) maintains that South Africa is fortunate in that there is a large healthy domestic tourism market and an increasing influx of international adventure tourists.

At the start of the new millennium, the South African Government recognised ecological and adventure tourism as the fastest growing tourism segments in South Africa (Aucamp, 2006). Aucamp's (2006:4) primary focus was "to determine if SAT is taking a leadership role in establishing a competitive adventure travel industry". The findings suggest that little research has been done on adventure tourism in South Africa. Furthermore, it will be the responsibility of national organisations, such as SAT, to initiate more structured processes and long-term strategies to ensure that the adventure tourism sector receives enough attention to grow into a premier type of tourism in the years to come. The research suggests that for a successful and sustainable adventure travel sector, more in-depth knowledge is required about the adventurer and the structure of the industry. Furthermore, the research confirmed that strategies and marketing practices should be based on real expectations of consumers (Aucamp, 2006). Research by Rogerson & Visser (2011) further highlighted the significant growing involvement by both the government and private sector to market the adventure tourism attractions of the country.

Rogerson (2007) investigated the challenges of developing adventure tourism in South Africa. His survey included 55 adventure suppliers spread across South Africa. These suppliers were found to match the general distribution of backpacker locations in the country. Rogerson (2007) further found that South Africa has tremendous potential for growth in the adventure tourism sector, even though it lacks the recognition it deserves. Another finding suggests that South Africa should plan to

undertake to research and profile the specific “opportunities and drivers for the sector” (Rogerson 2007:13).

Van der Merwe, (2009) adopted a multi-criteria evaluation (MCE) to identify the potential for adventure tourism in the Western Cape area. This research shows the value of adding weights of importance to each layer used in a GIS. More so, the study made use of a panel of experts to ensure the weights were valid in the real world context.

On the international stage, an adventure industry snapshot survey was undertaken by the Adventure Travel Trade Association (ATTA, 2011) in 2009. The survey consisted of 287 completed questionnaires from respondents in 51 countries. South Africa had the second highest number of responses (10.5%) after the United States of America (31%). An aim of the survey was to ascertain which regions of the world were showing an increase in customer interest. South Africa was ranked in the top three, as it showed a 24% increase in interest for the first and second quarters of 2009 (ATTA, 2010).

2.3 Dynamics of tourist and tourist destination interaction

2.3.1 The view of the guests

It was noted in Egmond (2007) that one of the primary reasons for travellers wanting to visit less-developed countries was not only for the typical wildlife and natural beauty, but also to get in touch with the host inhabitants and experience their culture first hand. A dependency on organised tours still exists with respect to individuals from developed countries who visit the developing South. There are primarily six reasons (Egmond, 2007) for this trend. Firstly, the traveller wants to experience as much as possible during the trip, and it is convenient to rely on the tour operator whose expertise can be used to map out a specific route and organise the experience accordingly. Secondly, persons from developed countries are immersed in a time-consuming lifestyle. This lifestyle leaves little preparation time for a trip to a remote destination. It is much more convenient to allow a reputable tour operator to organise the trip. Thirdly, the unfamiliarity with the country gives the traveller a sense of nervousness when booking something that he/she is not familiar with. Fourthly,

the involvement or participation in a group will reduce the stresses felt from culture shock (to be explained in Section 2.3.1). Fifthly, the traveller may prefer to meet like-minded people along the route and, by joining and participating in a tour group, it is likely that he/she may eventually meet like-minded people. Lastly, crime against tourists compels travellers, especially single female travellers, to travel in groups.

Research undertaken by Landis and Brislin (1983) identified that cultural conflict can arise when interaction between different cultures results in miscommunication and misunderstanding. Studies undertaken by Samovar et al. (1981) indicated that there is a relationship between language and cultural conflict. Language differences result in communication problems, which can give rise to a conflict situation.

Hofstede (1980), in his landmark study, identified four value dimensions that distinguish people from various nations. These value dimensions are power distance, uncertainty avoidance, individualism-collectivism and masculinity-femininity. He concluded that consumers do not have limitless time, knowledge and information processing power to make rational decisions; instead consumers make choices based on the bounded resources available to them (Hofstede, 1980). A type of 'tourist culture' emerges. This is the culture that the tourist brings to the vacation location. The tourist culture describes or explains the tourist behaviour. According to Reisinger (2003: 10), the 'tourist culture' is the culture of the tourists with whom the hosts are in contact. "Tourists behave differently when they are away from home because they are in a different state of mind and are in 'play' mode" (Reisenger & Turner, 2003:10). Hosts behave differently because they offer the visitor hospitality services. Reisenger & Turner, (2003:12) proposes that a tourist culture is a type of a "mental programming and the consequences of behaviour derived from this programming." Research by Jandt (1998, as cited by Reisenger & Turner, 2003: 13) concludes that humans are seldom aware or conscious of their own culture; it is only when they travel to a foreign destination and when they mix with other cultures not their own that they become aware of their own culture. Pizam & Calantone (1987) suggests that tourism is a service industry where people from different cultures meet; however, it is apparent that what one culture regards as conventional and acceptable may not necessarily be welcoming to another culture, but insulting and irritating

instead. It is therefore important for tourism researchers to understand the cultural dynamics between international, and host societies.

The trend suggests that in less developed countries “where cultural differences between tourists and hosts are greater than in more developed countries, the negative effect of direct tourist-host contact is increased” (Reisenger, et al. 2003:43) (row 1 in Table 2.3 lists another author who has researched this topic). Reisenger & Turner (2003: 43) suggested that wealthy tourists who visit third world countries have little respect for host values and often show tendencies of being aggressive and insensitive. This clashing of host and tourist culture occurs in a variety of different contexts. According to Reisenger & Turner (2003: 54), it includes non-vocal behaviour, religious beliefs, time orientation, attitude to privacy, manners, customs, forms of address and body language or gestures. Pearce (1982) splits the interaction into three broad categories and suggests that all these elements vary from culture to culture. The first element includes language, fluency, expressing attitudes and emotions. The next element is non-verbal signals that comprise facial expressions, eye gaze, spatial behaviour, touching, posture and gesture. The last element includes rules and patterns of interpersonal interaction, normally in the form of greetings, self-disclosure and making or refusing requests.

This clashing between cultures results in ‘culture shock’. Culture shock is one of the most acknowledged problems encountered by travellers to foreign cultures. A number of researchers (see row 2 of Table 2.3 for a summary of authors referred to by Reisenger & Turner 2003:50–52) analysed the culture shock experienced by tourists. Culture shock is caused by an “inability to cope in a new cultural environment, being overloaded with unfamiliar stimuli one cannot comprehend, confronted with different ways of life and doing things, inability to ask questions and understand the answers, or recognise food” (Reisenger & Turner, 2003:53). Reisenger & Turner (2003:57) notes that a visitor to a foreign culture “adopts the mentality of a child and learns the simplest things over and over again often leading to difficulty; this often leads to distress and hostility in the new environment”. Researchers who investigated the negative symptoms of culture shock are listed in row 3 of Table 2.3. The negative symptoms involve a “*sense of loss from being removed from ones environment, feelings of impotence from being unable to deal*

competently with the new environment, embarrassment, humiliation, depression, feelings of rejection, confusion about one's own family, identity, incompetence, frustration, negative feelings towards hosts, refusal to learn new language, increase in irritation, fatigue, criticism, decline in initiatives and even preoccupation with cleanliness and worries" (Reisenger & Turner, 2003:57). Culture shock occurs in a variety of different contexts. Foreign tourists (those tourists who are not citizens of South Africa) are also likely to experience a degree of culture shock when encounters with hotel staff or the receptionist, as well as host taxi drivers and interaction with shop assistants or custom officials occur (Reisenger & Turner, 2003).

With the expansive growth of tourism into more remote parts of the world, the need to understand the culture and manner of interaction in the host country is essential in managing a sustainable tourism industry. More research is needed on understanding the cultural backgrounds of both the host and visitor, and that without this understanding, there is likely to be an increase in misunderstanding or conflict between different cultural groups (Reisenger & Turner, 2003:69).

Table 2.3: Other authors contributing to the field of tourism cultural studies (as cited by Reisenger & Turner, 2003:43

Reference number in text	**Topic researched**	**Other authors**
1	Cultural differences	Pearce 1982
2	Culture shock	Bochner, 1982; Oberg, 1960 and Taft, 1977
3	The negative symptoms of culture shock	Oberg, 1960; Taft, 1977

2.3.2 The view of the hosts

Each country has a unique set of attractions for tourists. These can include "entertainment, food, drink, work, dress, architecture, handicraft, media, history, language, religion, education, tradition, humour, art, music, dance, hospitality" (Reisenger & Turner, 2003:4-5). The hosts offer one, all or a combination of these factors, which make up a nation's way of life.

When the host interacts with a different culture, it can be defined as intercultural contact. When the host is in contact with more than two cultural groups, it is called

cross-cultural contact. The positive impacts of cross-cultural contact are “mutual appreciation, understanding, respect, tolerance and liking” (Reisenger & Turner 2003:38). Cross-cultural contact can lead to the development of positive attitudes, reduction of ethnic prejudice, stereotyping and racial tension, cross-cultural contact improves social interaction between individuals and contributes to the improvement of relations between different cultures. Refer to row 1 of Table 2.4 for another author (cited by Reisenger & Turner, 2003:38) who has researched the field of positive cross-cultural contact Cross-cultural contact can also lead to negative interactions — authors (and the topics they researched) as cited by Reisenger & Turner (2003: 38 - 40) are listed in rows 2 to 5 of Table 2.4.

Table 2.4: Other authors contributing to the field of tourism cultural studies (as cited by Reisenger & Turner, 2003:39-40)

Reference number in text	**Topic researched**	**Other authors**
1	Positive Intercultural contact	Bochner 1982
2	Negative Intercultural contact	Sutton 1967; Jordan 1980; Bochner 1982
3	Frustration and stress with tourist presence and behaviour	Taft, 1977
4	Stereotypes, prejudices, increased tension, hostility, suspicion and often violent attacks	Bochner, 1982
5	Differences in national origin and cultural values	Feather, 1980a, 1980c

A number of theoretical models are relevant to the measurement of contact between hosts and tourists. One of the more renowned models is the Tourism Impact Attitude Scale (TIAS) which was developed for gauging host community attitudes towards tourism (Lankford & Howard, 1994). Another reputable model is the Doxeys Irridex Model. According to, this model (Doxey 1975), initially developed in 1975, projects a host community’s attitude toward tourism and suggests that it will be irreversible and will progressively become more negative, moving from euphoria to antagonism as the impact of tourism development become more apparent to the host inhabitants. The Social Exchange Theory involves the “trading and sharing of resources between individuals and groups” (Lankford & Howard, 1994:13). This theory interested tourism researchers because of the assumption that tourism development comes

with economic benefits in exchange for social and environmental impacts. According to Ap & Crompton (1998), the social exchange theory assumes that the primary motive for exchange is the improvement of the communities' social and economic well-being by private entrepreneurs and public economic developers.

2.3.3 The lifecycle of a tourist destination

A number of theoretical models are aimed at understanding the lifecycle of the tourist destination. Christaller (1963) suggested a process of continual development of tourist areas. His example of a group of painters seeking a secluded spot to paint in peace, and its eventual evolution into a commercial hub and eventual decay, is a timeless portrait of a tourist destination and a typical lifecycle (as cited by, Shaw & Williams, 1994:165). Another important model is that of Wolfe (1983), which takes into account the environmental change at a tourist destination. In the early stages, tourism can contribute positively to the growth of the economy and the sustainability of the environment. As the tourist numbers increase, the impact on the environmental features is more strained and results in more negative than positive impact (as cited by, Shaw & Williams, 1994).

Butler (1980, as cited by, Butler, 2006:4-6) proposed and developed the Tourist Area Life Cycle (TALC) model that helps researchers and tourism practitioners understand the growth and decline of a typical tourist destination. Butler (1980) suggested a six-stage cycle of evolution of tourist destinations which is largely defined by visitor numbers (as represented in Figure 2.2), and also arguably by infrastructure, as described is the summary preceding the figure. The last stage is characterised by a period of decline, rejuvenation or stabilisation. Butler's theory is widely recognised as the most significant to destination management in tourism research. The major criticism against the use of this model is that most of Butler's (1980, as cited by Butler, 2006:4-6) empirical evidence for the model is collected for destinations mainly in the developed world.

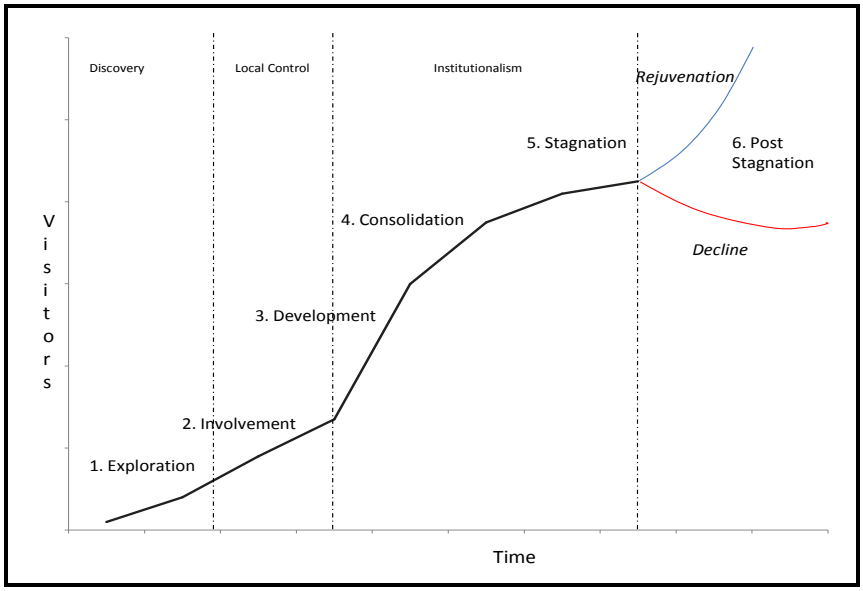


Figure 2.3: Tourist Area Life Cycle Model (TALC) (Butler 1980, as cited by Seymour, 2008: 2)

In the first stage of Butler's model, called the **Exploration Stage**, there are few adventurous tourists visiting a destination with few public facilities. The adventurers are primarily attracted by the physical and/or novel cultural features of the area. Seymour (2008:3) applied the model to the KZN context and identified the hikes at the "uppermost reaches of the Drakensberg on the escarpment of Lesotho and South Africa and visits to the traditional Sotho villages in the area" as typical of the exploration stage.

The second stage, the **Involvement Stage**, is characterised by some interaction between tourists and host communities and leads to the provision of basic services. The "hiking trails and hiking huts and centres of the Mnweni valley, a traditional tribal area of Drakensberg World Heritage site" were identified as potential locations in KZN (Seymour, 2008:3).

The third stage, the **Development Stage**, sees additional tourist facilities being developed at the destination. There is a noticeable increase in the control of the tourism trade by outsiders. The number of tourists at peak periods outweighs the size of the host population. According to Seymour (2008), the iSimangaliso Wetland Park near St. Lucia is typical of this stage.

The fourth stage, the **Consolidation Stage**, is characterised by tourism playing a major role in the host economy. Some of the older services and products deteriorate. The number of visitors will decline, and major parts of the area will be tied to tourism. Marketing and advertising reached its peak. According to Seymour (2008), villages adjacent to the iSimangaliso Wetland Park are typical of this stage.

The fifth stage, the **Stagnation Stage**, sees the tourism capacity being reached. The destination begins to lose its fashionable status and there is a high dependency on repeat visitors. Peak numbers of visitors will be reached. The tourism authorities make strenuous efforts to maintain consistency in visitation levels. Naturally genuine cultural attractions will probably be superseded by imported artificial facilities. According to Seymour (2008), the South Coast resort town of Amanzimtoti is typical of this stage.

The sixth stage, the **Post Stagnation Stage**, is characterised by a period of decline, rejuvenation or stabilisation. The intensity of the decline, rejuvenation or stabilisation depends on strategies being effectively implemented. This stage sees a mobilisation of rejuvenation strategies, or decline where tourism facilities are given up for other uses and fewer tourists stay in the area. Seymour (2008) identifies the city of Durban as having the characteristics of this stage.

2.4 Management and tourism information

2.4.1 The rationale for responsible management

Spenceley (2008), Telfer & Sharpley (2008) and Godfrey & Clark (2000) mentioned that the 21st century traveller explores places further away from the traditional locations. Egmond (2007) noted that this shift in travel thinking has been on the rise since the later parts of the 20th century. These trends opened the door of opportunity for many developing countries of the world. The main prerogative for these developing countries is to escape the chains of poverty (Spenceley, 2008). With the trends suggesting an increase in tourism in developing countries, governing authorities are increasingly turning to tourism as a possible development strategy. It is often referred to as a ‘lifeline’ in less developed countries, because it is an effective catalyst for socio-economic growth (Telfer & Sharpley, 2008; Opperman &

Chon, 1997). However, a more sobering reality noted by Redclift (1992) is that the poor in developing countries often have very few options but to choose immediate economic gain at the expense of long-term sustainability of livelihoods.

Developing countries are often faced with a multitude of forces that negatively impact on tourism growth — examples political upheaval, natural disasters, health scares and high prevalence of crime (Reid, 2003, as cited by, Tribe & Airey, 2007:50). The positive and negative impacts of tourism on developing countries (Egmond, 2007) are summarised in Table 2.3.

The negative impact of mismanagement has a direct effect on the tourist's experience. This is due primarily to a lack of effective strategies to educate the visitor. Irresponsible behaviour is when travellers "*practise dangerous sports and leisure activities, drive dangerously and consume unsafe food and drink; travel when in poor health, which may become worse during the trip; cause conflict with local residents, through inappropriate behaviour toward local communities or by breaking local laws; carry out illicit or criminal activities; enter dangerous areas; and lose personal effects, documents and money through carelessness*" (Wilks & Page, 2003:5-6).

Table 2.5: Positive and negative impacts of tourism on developing countries (Egmond, 2007)

	Positive	**Negative**
Economic change		
Employment	Little experience is required at entry level; relatively easy and simple to create a tourism product; requirement for more labour as opposed to other industry sectors.	Generally low-paid, seasonal, mostly part-time; lack of directed career direction; long hours can lead to unsociable behaviour by the host.
Income	Tourism enterprises add to the GDP of the country; taxes gained from tourism can be used to grow the sector.	Mostly all destinations will have to import some expert skills into the destination.
Economic Diversity & regeneration	Tourism has a domino effect on other economic meeting points; the labour force is immediately available from the host population; compared to other sectors such as manufacturing, tourism is a generally green sector.	Cost of land may increase; demand on wage increase over time; open spaces become an issue and costs can increase exponentially over time; tourism shops can overtake the traditional shops and force them out of business.
	Continued on next page	

	Positive	Negative
Social cultural change		
Quality of life	It impacts positively on personal income; tourism in general supports nightlife such as restaurants, discotheques and theatre; improves the variety of goods sold in shops; open spaces and recreational spaces are kept to high standards so tourists can enjoy their experiences; the authority spends more time making sure the area is maintained.	Traffic congestion; public places become overcrowded; overcharging at host shops; pick-pocketing and crime at tourist hotspots; Irradex model, which suggests that hosts over time become annoyed.
Sense of place	Re-ignites the traditions of culture; instils a sense of pride in the hosts; tourism is a catalyst for host businesses to expand their reach by moving into the periphery; traditional festivals and folklore customs can become a tourist attraction.	Traditional festivals can be adapted to suit the needs of the hosts, which could destroy the values of the tradition and thus lose generations of traditional customs; crafts may be mass produced away from the host market, which creates leakages in the revenue stream.
Natural environment	Results in improvement of open spaces and recreational areas; the sun, sea and sand areas are maintained for tourist consumption; the depletion and pollution of tourism resources for tourism managers.	Reduction in vegetation because of the construction of tourist facilities; compaction and erosion of the soil; garbage and litter increases; water quality is reduced; wildlife is negatively impacted by predator-prey relationships; loss of wildlife due to trophy hunting.
Environmental change		
Built environment	Tourism development can be used to enhance funding for host projects; renovations to previously dilapidated buildings; run-down areas are normally improved for tourists; transportation and infrastructure around tourism attractions will be upgraded.	Architectural pollution, since new buildings do not match the older buildings; urban development can, if not properly planned, decay the built-up environment; the host service infrastructure is strained, resulting in breakdown of essential services such as the sanitation and water systems; traffic congestion and noise pollution in tourist hotspots can lead to hosts becoming annoyed with visitors; walkways and stone paths can be damaged by over-walking by tourists; graffiti and vandalism in tourist hotpots.
environment	Results in improvement of open spaces and recreational areas; the sun, sea and sand areas are maintained for tourist consumption; the depletion and pollution of tourism resources for tourism managers.	Reduction in vegetation because of the construction of tourist facilities; compaction and erosion of the soil; garbage and litter increases; water quality is reduced; wildlife is negatively impacted by predator-prey relationships; loss of wildlife due to trophy hunting.

Many tourists travel with an “apparent lack of knowledge, understanding or sensitivity to host culture or customs in destination areas” (Telfer & Sharpley, 2008:194). This lack of knowledge and understanding may result in a negative impact on the sustainability of the destination. Firstly, it may increase the profile of the remote environment, enticing adventurers to visit remote environments. Secondly, the conventional information may “encourage behaviour that is not sensitive to the environment or host community” (Swartbrooke et al., 2003:147). Thirdly, conventional information may lead to improper photography of hosts and four wheel-driving at the destination that destroys the host vegetation system. Lastly, the

conventional information may fail “to give travellers information to allow them to be sensitive” (Swartbrooke et al., 2003:148).

Payne & Dimanche (1996) suggest that responsible management of the tourism sector depends on embracing three important conclusions. Firstly, the tourism industry must recognise that it is based on finite resources. Economic development should be limited in the natural environment to ensure a sustainable path. Secondly, the tourism sector must involve the community from the earliest possible time of development. Greater consideration must also be given to the socio-cultural costs of tourism development. Thirdly, the tourism sector must also come to consensus that it is a service-oriented industry, and that it must treat employees as well as customers in a fair and ethical manner. These three considerations should be regularly tested in the framework of responsible tourism management strategies.

2.4.2 Information systems as a management tool for decision-making

Expert systems played a substantial role in growing the world tourism sector. Expert systems can be defined as “those systems of technical accomplishment or professional expertise that organise large areas of the material and social environments in which we live today” (Egmond, 2007:43). The credit card system is an example of an expert system that made it possible to increase consumer spending without needing foreign currency. Other expert systems include management systems for international hotel chains, aviation transport networks, linked management systems and tourist information systems on the World Wide Web. Ritzer (2000) and Ritzer & Lisker (1997) (as cited by, Egmond, 2007:44) suggest that it is the “McDonaldised” and “McDisneyised” way of thinking. The advancements in expert systems are related to computer technology in the fields of engineering, architectural and industrial designing, CAD (computer-aided design), VR (virtual reality) and GIS (Jamieson, 2006).

Bahaire & White (1999) agree that a GIS can be of great value for tourism planning. Berry (1991) and Robinson (1992) use the functionalities of a GIS to investigate the environmental issues in resource management of tourism. Countryside management was reviewed by Haines, Bunes & Parr (1994 as cited by Bahaire & White et al., 1999); travel costs were analysed in GIS by Batemen, Garrod, Brainard & Lovett

(1996, as cited by Bahaire and White, 1999:163). Heywood et al. (1994 as cited by Bahaire & White, 1999: 163-166) show how a GIS in tourism can model and increase tourism development in specific areas based on scenario analysis. Boyd & Butler (1996) described how a GIS application has the functionality to suitably locate ecotourism locations in Canada. Williams, Paul & Hainsworth (1996, as cited by Bahaire et al., 1999) used a GIS to record and analyse a tourism resource inventory in British Columbia. As far back as 1988, Healey et al. (1988, as cited by Bahaire et al., 1999:167) described how a GIS can impact the conservation of host resources on the Scottish Island of Islay. Research on the Lake District in the United Kingdom in the 1980s identified the distribution patterns of the wintering wildfowl, as well as species that are vulnerable because of tourism activity (Cooke & Watmough, 1988, as cited by Bahaire et al., 1999:167). Thomas (1996) showed that hosts can play a more participatory role because of the introduction of large scale maps to the planning workshops. The maps can visualise large numbers of statistics that are easy for the hosts to comprehend. This participatory GIS approach is an ideal evolution in using a GIS to make communities feel involved in planning, especially in developing countries (as cited by Bahaire et al., 1999: 169).

In the Eminonu district of Istanbul, a GIS was used to optimise planning for sightseeing. The system also allowed for spatial querying of geographical data while simultaneously visualising the outputs through colour maps. Network analysis algorithms allowed tourists to see route options using the shortest distance or shortest time criterion (Turk & Gumusay, 2008). Dondo, Bhanu & Rivett (2000) studied the Zimbabwean situation. A major drawback in Zimbabwe is the lack of digital data. Most of the records are still in hardcopy format. The main objective of the Zimbabwean tourism GIS is to identify where customers are located, in order to calculate the potential turnover of the business and to identify potential sites for business (Dondo et al., 2000). One of the lessons learnt from the Zimbabwean experience is the question of who the information should be shared with and why. Ayeni, Saka & Ikwuemesi (2002) reviewed the state of GIS in Nigeria. The Nigerian authority developed a multimedia GIS that could integrate different types of data such as text data, graphical (for example maps and graphs), still and moving picture data and voice and music sound data. The strong multimedia approach allowed

different departments to access multiple sets of information representing the same data (Ayeni et al., 2002).

Beedasy & Whyatt (1999:163-173) researched the situation in Mauritius. A GIS was used, applying a weighted linear technique, to identify potential hotspots. A vector square grid that mimicked a raster grid approach was used. The purpose was to have a clearer understanding of the island's tourism potential, and also to be able to analyse large amounts of spatial data using a relatively simple methodology. In Sri-Lanka, (STIP) was implemented to locate and map sustainable trails (Boers & Cotrell, 2005). This was achieved by collecting and analysing information on visitor preferences and managerial objectives. A GIS was used to identify elements geometrically, thematically and topologically. The project was implemented in the Sri-Lankan Sinharaja forest reserve, a tropical rainforest in the Sri-Lanka's South Western wet-zone. The STIP system had three phases: a visitor segmentation phase, a zoning phase and a transportation network planning phase (Boers & Cotrell, 2005).

Tourists' perceptions, such as desired and expected experiences, were measured and included in the system. These perceptions were focused on preference for cultivated activities, preference for nature-related activities and preference for bird-watching (Boers & Cotrell, 2005). The zoning stage involved demarcated regions according to development carrying capacity criteria. The STIP system further integrated visitor experience using weights, depending on their preferences for specific likes in a zone. Zones identified were: 1, primary forests; 2, secondary forests; 3. degraded forests; 4, encroachment; 5, forest plantation; 6, ridge forests; 7, agriculture and 8, scrublands and grasslands. Each of these regions was analysed to determine the quantified preference by tourists to partake in either 'nature' or 'culture' activity. The resulting values were attached as weights to the zones and tagged to a layer of vector grid cells. The output maps were given weights that depicted the zones of contiguous cells, geographically in a GIS. The first two steps involved the identification of visitor segments, followed by STIP zones. The STIP system recognised that not all preferred zones will or can, due to visitor and resource constraints, be made accessible. A layer of vector grid cells was used to collate the results of the weighted output data. The adopted spatial unit size was 30m × 30m.

Each grid cell was manipulated to “indicate maximum trail density, or maximum allowable square meters of trail per hectare” (Boers & Cotrell, 2005:10). These indicators were aligned to the agreed on types of trails to be developed in the regions. The research identified some limitations. Firstly, the grid-cell approach requires an intensive data acquisition stage to build a reliable model of reality. This can pose a problem, as data availability is often a problem. Secondly, there is still a lack of understanding with regard to network morphology in relation to visitor “satisfaction in specific and sustainable tourism development in general” (Elands, 2002, as cited by, Boers & Cotrell, 2005:10)

Xiao, Benett, Middleton & Fessel (2002) developed a GIS model to address swamp regeneration in Southern Illinois, USA. The swamp has tremendous intrinsic and ecological value impacting on the host, regional, national and international setting. The swamp began to decay after years of channelling waters for commercial agriculture and related unsustainable practices. The primary aim of the Southern Illinois Swamp Model (SISM) was to “*help better understand the long-term impacts of changes to the hydrology of the Cache River Watershed in the regeneration of Buttonlan Swamp and to help investigate the utility of alternative management scenarios*” (Xiao et al., 2002:108). The research analysed a total of 125 layers of information. The data model was formulated as a multi-layered grid, 2 m by 2 m cells for seedlings and 20 m by 20 m for plots. The research noted the importance of having a uniform vector grid layer to visualise the spatial distribution of the features related to the swamp area.

2.5 Information needs of the adventure traveller

2.5.1 Conventional information required by the adventure traveller

Information required for trip planning can be understood by reviewing trip planning and destination choice models. These models portray the complexity surrounding planning for a trip (Opperman & Chon, 1997:83). Trip planning is a complicated and time-consuming activity. The pre-trip planning involves a number of active steps to attain the comfort of knowing the trip would be successful (Hruschka & Mazanec, 1990; Godart, 2001). The traveller goes through several stages; from the initial awareness of potential destination, to short-listing and then to a selection of the final decision. Mansfield (1992, as cited by Opperman & Chon, 1997:83) suggests that

the final decision to travel depends on seven filtering factors. These factors are the availability of free time, disposable money and paid holidays, accessibility of transport systems, family obligations, workplace obligations and values and norms of tourism behaviour prevailing among the individual's reference group.

Once the decision is made to travel, the process begins to devise an itinerary for the proposed trip (Opperman & Chon, 1997:83). Research (Mings & Mchugh, 1992; Lue, Crompton & Fesenmaier, 1993) suggests that different types of tourists each require their own, unique itinerary (as cited by Opperman & Chon, 1997:86). With time, tourists learned to become more demanding about their trips. Their preferences shifted away from standardised holiday packages designed by tour operators, to personalised products, specifically selected and arranged to meet the uniqueness of the individual. This change leads to greater customer involvement in the trip planning process (Opperman & Chon, 1997).

The adventurer, similar to the typical traveller, undertakes to 'know' for him/herself. Questions are asked about where they would likely seek information and what information would be needed before the trip, during the trip or after the trip. The suppliers of tourism services and products must also be wary of where the prospective travellers are most likely to source information, whether through the Internet, on the television, in an advertisement in a broad-sheet newspaper, or through a travel agent or a tour operator's brochure (Boniface, 2006:). Egmond (2007) suggests that visitors from the West to the South or from developed countries to developing countries usually depend on tour suppliers for tour bookings. Organised tours are convenient for foreigners, as they experience a sense of uncertainty with regard to the foreign natural and human environment. The organised tour gives them a sense of comfort. With regard to the adventurer, tour packages are often pre-planned and carefully orientated and orchestrated to deliver an adventure experience.

According to Swartbrooke et al. (2003:146-147), conventional information for the adventurer consists of four broad categories.

1. Guidebooks such as the Lonely Planet, Let's Go and Rough Guide series.

2. Travel writing of those who experienced extreme adventures and published material on it.
3. Specialist magazines dedicated to niche sports such as paragliding and mountaineering.
4. Television adventure travel programmes that produce eye-opening and entertaining adventure-related shows.

Wilks & Page (2003) suggests that the adventurer must be knowledgeable about three types of practical information about the actual adventure. Firstly, the needed technical skills; secondly, the perceived difficulty of the activity and thirdly; the overall physical and emotional demands placed on the participant.

Securing information required for a successful trip is a complicated and time-consuming activity. In the past, the main difficulty for tourists was the accessibility of pertinent information relating to schedules, availability, fares and rates. This was typically the domain of travel agents. Today, the Internet and other recent information and communication technologies play a powerful role in enabling customers to choose and purchase travel components to plan their own trip (Reinders & Baker, 1998, as cited by Godart, 2001:2). More recent web technologies, such as semantic webbing and ontological searches, are rapidly making searching and finding useful information more possible (other technological advancements will be briefly reviewed in Section 2.5.3. Though technology is advancing, Hruschka & Mazanec (1990, in Godart, 2001:2) maintain that tourist services are still disparate and it will take more years of technological efficiency to streamline the service offering.

The Internet plays an important role in new age marketing. It is a type of marketing medium that suits small to medium-sized companies. It allows suppliers to continually update their messages to clients around the world instantaneously and continually. The Internet is a truly global platform and tourist bookings can be made day or night from anywhere in the world. The Internet is also a relatively inexpensive form of marketing and promotion and can be very effective in targeting niche markets like adventure tourism. Renowned guide books, such as the Lonely Planet and Rough Guide series, can publish their content on websites. This medium can boost

their reach to the digital market. Spontaneous decisions are possible with the Internet since it can be accessed virtually anywhere and anytime (Swartbrooke et al., 2003). Conventional information was brought into a new reality with the democratisation of mapping practices by means of online mapping portals. A good example is Google Earth. It has unlocked roads, office buildings, railways, factories, far-flung ruins and remote locations, among many other spatial layers. With increasing Internet speeds, it is possible to 'virtually' adventure travel to some of the furthest corners of Planet Earth (Sheppard & Cizek, 2009).

2.5.2 Information required for responsible travel

Boniface (2001) suggests that tourist information should, to some degree, impact the traveller's consciousness, thus enabling some vital bits of information to become ingrained in the traveller's mind. These tactics can be in the form of well-planned visual signage boards, digital media using desktop and mobile devices, as well as descriptive and relevant hardcopy material. Wilks & Page (2003) propose that information can be delivered in the form of orientation programmes, guide lecturing, brochures and pamphlets and enforcement actions.

The 'consciousness' value of the information is important. A universal rules set, researched by Argyle & Henderson (1984) and Argyle et al. (1985), guides tourism authorities (as cited by Reisenger & Turner, 2003:144). The rules set comprises the following:

1. one should respect other's privacy;
2. one should look the other person in the eye during a conversation;
3. one should not discuss what is said in confidence;
4. one should or should not indulge in sexual activity;
5. one should not criticise the other in public; and
6. one should repay debts, favours or compliments no matter how small.

Knowing where and how the visitor will interact with the destination will help in devising the content of the information. This is normally when first impressions are comprehended. It is during this 'first impression stage' that perceptions are defined. Perception is an important part of an individual's personality and impacts directly on

the relationship between the host and the visitor. Reisenger & Turner (2003:149) define perceptions as “the process through which people see the world around themselves”. First impressions are normally made of taxi drivers, security officers, airline hostesses, baggage assistants and registration staff. If there is a negative perception of the host, this will influence the traveller’s decision to travel and the eventual satisfaction of the experience (Reisenger & Turner, 2003:159).

Being aware of the universal rules set discussed above (Argyle & Henderson, 1984 & Argyle et al., 1985, as cited by Reisenger & Turner, 2003:144), and how first impressions will be digested , are important factors in bringing together the information required for responsible travelling. The essence of the informative message should be tailored around the following four categories (Moscardo, 1999: 7):

1. visitors should operate in the limits of the resource by limiting impacts;
2. authorities should provide the visitor with an understanding of the environmental characteristics that sustain the experience;
3. vigilant adherence to capacity issues; and
4. educating the client about activities appropriate to the region.

It would, however, ultimately be the behaviour of the visitor, once the message is delivered, that would ascertain the value or impact of the message. The impact or effectiveness of the message can have an effect on the individual’s choice to visit, his/her preparation, as well as his/her actual behaviour during the visit. Moscardo (1999:27) also indicates that an effective message consists of the following: 1 – variety and change, 2 – use of multi-sensory media, 3 – novelty / conflict /surprise, 4 – use of questions, 5 – visitor control/Interactive exhibits, 6 – connection to visitors, 7 – good physical orientation.

Jamieson (2006) adheres to the ‘unique’ approach to information creation. He suggests that tourism managers have a responsibility to interpret the destination’s resources in a way that will allow the tourists an unforgettable experience. *“The more connected and engaged the visitors feel with the community, the more memorable their experience is, and the more unique, accessible, and authentic they feel the community and its people to be”* (Jamieson, 2006:85). This sense of ‘connection’ can

be integrated through an interpretive storyline of the community's folklore about their history, people and cultural heritage. The community's cultural heritage refers to the built and living culture, "architectural styles and building practices, temples, colonial and new churches, archaeological sites, festivals, myths, food preparation techniques, musical traditions, and unique ways of thinking and acting" (Jamieson, 2006:87). Jamieson is further of the opinion that the natural resources of the community, such as the rivers, mountains and parks, can also be part of the interpretive principle. There are a variety of media available to present the interpretive story of the community's natural and cultural heritage, such as the use of brochures strategically placed along walking trails, at visitors' centres, during festivals, through maps and through the use of computer technology (Jamieson, 2006:87).

Jamieson (2006) identified two ways of communicating information to the tourist; either in an interpretive way or in a factual manner. The main difference is in how information is presented as opposed to what information is presented. The goal is to use information to change visitors' perceptions and behaviour, "to motivate and inspire and to make information more meaningful and exciting" (Boniface, 2001:47). This inadvertently makes visitors more conscious and understanding of the community's point of view. Story-telling is an art, and it requires an individual to collect a variety of inter-related facts and experiences that can appeal to the visitor's emotional and sensory characteristics.

The dawn of the information age saw the birth of the post-modern traveller, keen to make his/her own decisions based on available information. Furthermore, the post-modern traveller or 'dynamic traveller' "needs to be made aware of the information so that he/she can make his/her own informed choices" (Boniface, 2001:48). An infinite number of statistics may be gathered. The task would be to 'see' the statistics with an imaginative mind and to devise a way to ensure that the story behind the statistics are cleverly told and appreciated by the traveller (Boniface, 2001:41).

The conventional information available in the KZN context is Internet portals that focus on the traditional cultural storyline of places and people in KZN, (world) renowned organisations tasked with monitoring and managing tourism resources,

regulation from countries actively involved with adventure tourism, World Wide Web associations and companies involved specifically with adventure tourism research and service provision and TKZN hardcopy brochures and booklets. A more detailed discussion of the information sources available in KZN is given in Chapter 4.

2.5.3 Communicating the information

With the dawning of the 21st century, social interactions became possible with the Internet's Web 2.0. Consumer Generated Media (CGM) and peer-to-peer applications such as social networking, tagging, content syndication, blogging, web forums, evaluation systems, virtual worlds, pod-casting, and online videos (Paris, Lee & Seery., 2010: 531). With all these niche technological advancements, a sobering reality still remains in that we are nonetheless similar to the early explorers, since we rely on available "knowledge and technology in order to effectively manage risk" (Wilks & Page, 2003:foreword).

As mentioned briefly in Section 2.5.1, desktop mapping applications are performing a vital role in geospatial information dissemination and delivery over the World Wide Web (WWW). Examples of such applications are Open StreetMap, Google Maps©, Map24©, Bing Maps©, ViaMichelin©, Ask.com Maps©, MapQuest©, WikiMapia©, Ovi Maps©, NearMap© and Mappy©. Of all these online applications, arguably the most well-known is Google Earth© and associated Google Maps, developed by the Google Foundation. Google© revolutionised Geographic Information Systems when they released the power of Google Earth and Google Maps. Information on Google Earth assists in visualising and understanding a wide spectrum of sciences, from pure sciences to humanities. With the advent of online geospatial tools such as Google Earth and Maps, geographical information is now finding its way to the desktops of social workers wanting to know where there is an abundance of unemployed people or climate scientists who are interested in knowing the patterns of rainfall in a particular location over a specific period (Pejic, Szilveszter & Bojan, 2010). Simon, Jessica & Graybill (2010:356-363) state that the study of Geography has become deceptively powerful since geographers can engage in public debates, ranging from homelessness to climate change, using platforms such as those mentioned in this paragraph.

Another relevant advancement on the WWW is the content aggregators, such as iGoogle© and MyYahoo©, which provide content based on the preferences of the users. Registered users are allowed to change their content as well as the look and feel of their personal page. Widgets were also identified as the key development in providing the user with the 'this is my content' feeling. Widgets are "pieces of software which can be personalised to the user's specific needs" (Matloka & Buhalis, 2010: 521). Widgets are computer program codes embedded in websites that allow an individual to interact one-on-one with the application. Information access becomes more efficient with this approach. Widgets can be found on sites such as Widgetbox, Widgepedia, Yahoo! widgets and Google Gadgets (Matloka & Buhalis, 2010: 520-521). Widgets can display news alerts, sport scores, maps, database statistics, weather reports and Really Simple Syndication (RSS) feeds (Lawton, 2007). Total personalisation of the widget is possible; from the look and feel of the interface to the location of the content, to ways in which the content is displayed. Widgets scattered the web into "*unimaginable numbers of semi-autonomous tools which on the one hand are suspended in a vacuum waiting to be picked by the user and on the other hand are able to do what they were built for regardless of location*" (Matloka & Buhalis, 2010: 521). The research done by Matloka & Buhalis (2010) found that widgets are here to stay and will be playing a major role in online space and the Open Global Destination Marketing System (OGDMS), and specifically in tourism information system technologies.

Mobile applications, or 'apps' as they are known, are becoming a large part of the consumer model for mobile companies and will also play an important role in communicating information to travellers in a mobile space. Each company is competing in their own space. Blackberry apps, iPhone apps and Android apps are some of the more recognised vendors for mobile applications. Social networking apps and instant messaging are proving to be very popular. In South Africa, services such as MXit have gone to great lengths to improve a service that caters for a variety of handsets, and it is cheap to buy. Apps that are not connected to a remote network are also proving to be very trendy. Apps that organise display and manipulate photos, music and calendar applications are proving to be most popular (De Gale, 2010).

According to the Global System for Mobile Communications (GSM), more than four billion mobile connections were already active by the end of 2008, while the number of PC users hit one billion in 2010. In 2007, there was a 114% growth in laptop sales, compared to a 1% growth in desktop PC sales. People are now more mobile than ever before and this situation is expected to increase (Schneider, Ricci, Venturini & Not 2010: 126). It is interesting to note that mobile platforms are adapting rather rapidly to changing technology. This includes the more recent smart-phones such as iPhones, Web browsing (WAP xhtml), J2ME and Android. SITA (2009) predicted that there would be three billion people moving around the world by 2015. Furthermore, “regional and international visitor flows will be multiplied by three” (Lamsfus, Sorzabel, Martin & Salvador, 2010: 603). UNWTO statistics (UNWTO, 2008) reveal that most of these visitors would have lived in the digital world and been part of Apple’s Iphone©, Google’s Android G1©, the Nokia E Series© or newer devices such as Netbooks. These are some of the widely acceptable smart technology mobile devices that society at large embraced (Lamfus et al., 2010: 604). Delivering context-rich spatial information to the user in the digital age evolved from the desktop PC to the mobile handset. Mobile handsets are now the new tools that can use geographic information, also known as a mobile GIS (Eleiche & Márkus, 2009).

There is no universally accepted definition of a mobile GIS (Li, Li & Lin, 2002; Karimi & Hammad, 2004; Fangxiong & Zhiyong, 2004). A mobile GIS can be defined as "the ability of mobile device to display geospatial data, and receive, process, and retrieve the GIS requests of mobile user" (Eleiche & Márkus, 2009:2). The device is essentially a portable unit with mobile communication, a processor, RAM and local hard disk. Over and above this, it is possible to surf the Internet, link to remote GIS databases, perform transaction operations and use a digital camera, while simultaneously having a live GPS connection through the network connection. The device could be a hand-held phone, hand-held personal assistant, personal digital assistant or a tablet PC (Eleiche & Márkus, 2009).

A mobile GIS is governed by two core principles: quick response and accurate information. Mobile computers made their first appearance in the market in the mid-1980s. Technology vastly improved the service offerings available in the tourism field; “mobile devices offer the opportunity to redefine tourism as we know it”

(Schliesser & Kim, 2007:107). The independent traveller now has the opportunity to access and navigate through information anytime, anywhere.

Mobile computing is the first fully realised phenomenon that is truly ubiquitous. This anytime, anywhere access of information can be termed ubiquitous. Ubiquitous can be defined as being everywhere at once (Dictionary.com, 2009b). With mobile computing using technology such as Global Positioning Systems (GPS) and Location Based Services (LBS), it became easier to access ubiquitous information. A context-aware computer has the ability to "adapt its behaviour in significant ways according to the users' location" (Weiser, 1991, as cited by Lumsden, 2008:206). The contributing factor to the success of mobile computing and ubiquitous computing is component miniaturisation-enhanced computing power and improvements in supporting infrastructure (Dey & Häkkilä, in Lumsden, 2008:205).

Mobile computing was, as stated earlier in this subsection, successfully channelled to the mainstream consumer-driven society, and is referred to as M-Commerce. Mobile services have many potential benefits such as high accessibility, the opportunity to enjoy e-commerce services irrelevant of time and location, as well as portability and location awareness capabilities (Siau, Lim, & Shen, 2001; Varshney & Vetter, 2002; Brewster & Dunlop, 2004).

Ahas, Aasa, Silm & Tiru (2007) discuss the various means of mobile positioning of the handsets in the cellular network. It can firstly be done by "using the reference of antenna or cells or through GPS signal" (Ahas, Aasa, Silm & Tiru, 2007:120). The most cost-efficient way is to use the Cell ID of the phone. "Every network cell in a mobile network has a unique ID. And the location of a phone in the cell can be determined easily for every call activity" (Ahas, et al., 2007:120). The geography of the cell is established and determined by the network station's radio coverage signal. The positioning data can be either passive or active. Passive means the location data is automatically stored in the database of the mobile operator. Active means the positioning data is collected using "mobile tracing and the location of the mobile phone is determined with special query using radio waves" (Ahas, et al., 2007:120). The choice between active and passive mobile positioning will depend on the functional requirements of the mobile application.

Technology has been developed to allow for a number of ways in which to locate a user's phone. Firstly, mobile devices with no automatic positioning can use a drop-down location list box or click on a location-sensitive map. Secondly, wireless LAN (Local Area Network) can activate the WiFi receiver that can relay back location information to the remote server. This transmits signals that can compute the position. This is, however, only available in areas covered by wireless LAN. Thirdly, and as mentioned in the paragraph above, the user may have a GPS receiver that enables identification of the location with accuracy. This works in most cases for outside activities. Fourthly, the network operators can calculate the user's position quite precisely by using the triangulation of the nearest network towers. Measuring the approximate signal strength of Bluetooth and WLAN hotspots and using the hotspots as beacons, is another method to estimate outdoor and indoor location. Location can also be ascertained by ultrasonic or infrared-based location detection (Burrell & Gay, 2002; Abowd, Atkeson, Hong, Long, Kooper, Pinkerton, 1997; and Borriello, Liu, Offer, Pailistrant & Sharp, 2005).

The technology discussed above enables the traveller to be continuously connected to online services while being mobile in a ubiquitous space. The four primary functions of LBS for travellers were identified by Berger, Lehman & Lehner (2003: 243-256) as

1. localization of persons, objects and places,
2. routing between them,
3. search for objects in proximity such as restaurants, shops, hotels or sights, and
4. information about travelling conditions such as traffic-related data.

Once the device is located, contextual information can be delivered to the traveller. Contextual information refers to the state of the individual and device, including surroundings, situation and tasks (Lamsfus et al., 2010:607). For the purposes of the study, the content from the original source Table which deals with the nature of mobile technology has been summarised and listed in Table 2.4 (Lee & Mills, 2007: 141).

Table 2.6: The nature of mobile applications (Lee & Mills, 2007: 141)

Characteristic	Description
Ubiquity	Services and applications provided through wireless Internet that can be made available at any time and at any place.
Localisation awareness	User location is always known; either by means of a mobile operator or a Global Positioning System (GPS).
Immediacy	Spontaneous decisions are possible since a user is given the capability to react in critical situations.
Personalisation	Also known as customisation, a user can receive personalised services. This gives each user a unique experience and focuses on meeting each user's needs in an effective and efficient manner.
Broadcasting	Mobile technology is an efficient way to disseminate information to a larger population; enables the users to share information, such as a picture, with like-minded people while on vacation.
Portability	Networks can allow users to retain their local phone number if they switch to another local service provider.
Identification	Sim cards can be used as electronic signatures, making the individual's identity always recognisable.

A number of relevant mobile applications exist for tourism, and these are discussed in detail in Chapter 4. It is, however, necessary to look briefly at the guidelines and theoretical models relevant to the design of a mobile application. The Human Computer Interface (HCI) guidelines can be adopted for desktop applications, as well as for mobile applications, and are governed by six principles. The HCI must be easy to learn and user-friendly, it must have a consistent screen design on all the related pages and it must avoid excessive scrolling. The HCI must further permit for non–modal interactions that allow online and offline interaction, provide status information of network coverage and retrieve information of the context or user profile information (Grun, 2005: 48-49).

Dey & Häkelilä (in Lumsden, 2008:212) also proposed a number of design guidelines or practical tips that can assist designers who are involved in developing context-aware systems. Similar to Table 2.4, the content from the original source which deals with the nature of mobile technology has been summarised and listed in Table 2.5.

Table 2.7: Mobile application development tips (Dey & Häkelilä, in Lumsden, 2008:212).

Guideline	Explanation
Select appropriate level of automation	The rule of thumb is that the more the uncertainty there is in context, the more important it is not to automate actions.
Ensure user control	The user control is diminished if the device behaves in an unexpected manner or if the user has a feeling that the device is performing actions without him/her knowing. Implementation of user-control dialogue prompts can balance unnecessary interruptions
Avoid unnecessary interruptions	Reminder and alarm clocks disrupt the user from his/her current active task, impacting on his/ her performance and satisfaction with the system
Avoid information overflow	Users can only focus on a small quantity of information at once. Systems should not burden the user with too much information at once, and should 'implement filtering techniques' for content that appears to be spam.
Appropriate visibility level of system status	Important changes in context and awareness should be made clear and visible to the user.
Personalisation for individual needs	User's personal preference can assist in filtering out information that would not be important.
Secure user's privacy	Special care is required to ensure that applications do not abuse the privacy issue. Different levels of privacy should support who is requesting the information, the perceived value of the information being requested and what information is being requested. Users should also be able to specify whether they wish to remain anonymous
Take into account the impact of social context	In certain social contexts, using a mobile device may be considered rude. It is in these contexts that there is a need for a balance of user-initiated and system-initiated actions. This also impacts on the user being interrupted, e.g. an audible alert vs. a vibrating alert.

A more renowned model, used in evaluating user acceptance, is the Technology Acceptance Model (TAM) of Davis (1993) and Sharp (2007) (as cited by Goosen, Lammeren & Ligtenberg 2010:112). The basic categories for evaluation are use, usefulness and enjoyment. The TAM model evolved into a Technology Acceptance Model for Mobile (TAMM). The first category of the TAMM is perceived value. This refers to the personalised fun and comprehensive user-specific information. The second category is perceived ease of use, which emphasises the fluent navigation, momentary use while on the move and, most important, relevant services. The third category is trust, privacy and confidentiality, which is paramount and must be unconditionally maintained throughout the user experience. Lastly, perceived ease of use stresses the real value of services offered to the user, as well as disposable services in an evolving usage culture (Kaasinen, in Lumsden, 2008: 102-118).

Grun (2005, 2008) focused his research on tourism models and proposes a set of guidelines relating to tourism mobile applications. There are six categories in Grun's (2005,) model. These categories of functionality are as follows:

1. the traveller should be able to download information related to his/her current usage situation on the mobile device as mobile maps;
2. the application should adapt to the most suitable network connection option;
3. the device should support the 'tourist lifecycle', which is not only during the trip, but also before and after the trip;
4. the characteristics of the information should support proactive tips, thematic layers and spatial proximity calculations;
5. tours should be pre-defined into the geographical database; this should be a simulation of popular historical tourist corridors, monuments and landmarks; and
6. routing and way-finding spatial algorithms should allow the user to navigate from one destination to another.

A number of niche domains exist that will undoubtedly impact on tourism technologies. All these fields will, in some way, use spatial knowledge. Some of these niche fields in desktop and mobile computing are artificial intelligence, semantic technologies, automatic learning algorithms, development of connectivity technologies, optimisation algorithms, human device interaction and persuasive computing (Openshaw & Openshaw, 1997; Lamsfus et al., 2010: 613-621). Lastly, and fittingly, the South African National Department of Tourism Strategy (NDT, 2011c:6) states that the future looks positive for information and mobile technology (M-Commerce). Such development will undoubtedly increase tourists' opportunity to choose between different tourist destinations, tailoring their own holidays and booking and paying for travel while being mobile. The traditional travel agent is increasingly being replaced by technological advancements. It is apparent that there is a distinct rise in mobile technology and social media. "It is not clear as yet how social media will evolve in the next few years, and which technology medium will win the race in the consumer mindset" (NDT, 2011c:6) .

2.6 Conclusion

In this chapter, the literature relating to the adventure tourism sector was discussed. Adventure tourism is steadily growing on the global tourism scene and is likely to

impact on the remote pristine locations of the world. The adventurer is an individual who is eager to experience an adventure that is outdoors and in a remote exotic location. Since adventure tourism is a relatively new type of tourism, the concept is still unclear and not well defined, but some important and relevant definitions of adventure tourism already exist. South Africa, as an adventure destination, has tremendous growth potential. The little research that was done noted that organisations, such as SAT should play a major role in marketing and researching the sector.

The tourist experiences a combination of adrenalin flow and culture shock when in a new foreign location. This impact on the behaviour of the tourist, often leaving the tourist awestruck by the newness of the experience. The locals also experience a mixture of feelings relating to the growth of the tourism sector. In the early stages there is a sense of acceptance. This is often replaced by trepidation, since tourists often interfere with the locals' traditional way of life (among other interferences). Models, such as the Irradex and Social Exchange theory, were discussed to highlight the trends between the locals and the guests. A review of the cycle of the tourist destination followed the discussion on the locals. This was linked to the interaction between the locals, the tourist and the tourism resource availability at the destination. The Tourist Area Life Cycle (TALC) model was used to discuss this destination evolution.

Authorities are tasked with ensuring that the tourism resources are managed in a sustainable manner. A GIS was identified as an ideal tool to assist authorities in planning and decision-making. There is a plethora of information available from a variety of different sources. The Internet plays a major role in disseminating and streamlining this information. Evolving mobile technology also plays a major role in tourism, and is an ideal platform for tourists, since they are in need of information while in a mobile space.

In the next chapter, the identification of adventure hotspots and the validation of the identification process (Objective one) are discussed in detail. The identification process is done by means of a vector grid approach in a GIS. The validation of the GIS findings is achieved by TKZN practitioners completing a survey questionnaire.

Chapter 3: Identification of adventure hotspots: methodology, analysis and validation

3.1 Introduction

It is important to know where the adventure hotspots in KZN are located. Accurate location can ultimately lead to better planning and decision-making, which would result in the sustainable growth of adventure tourism in KZN. Currently KZN does not have a system to identify and locate adventure hotspots. This provides geographers with a unique and exciting opportunity to understand the adventurer and to locate where he/she would ideally like to engage in an adventure activity.

This chapter deals with the first component of Objective 1, which was to identify adventure hotspots in the KZN province by using the functionalities of a GIS. This is followed by an examination of the second component of Objective 1, which was to validate and add further insight to the GIS findings by questioning the tourism practitioners from the KZN province.

3.2 Methodology adopted for adventure hotspot identification (component one of Objective one)

3.2.1 Defining a hotspot

This section describes the term ‘hotspot’, as used in this research. An introduction to the term was already discussed briefly in Chapter 1 (1.4.4). A GIS is the ideal platform from which to manage and analyse the spatial attributes used in this research to identify and locate adventure hotspots. To start deciphering a hotspot, it is important to develop a sense of spatial awareness of adventure tourism in KZN. Geographers have the ability to use this spatial awareness to develop a ‘spatial language’ that can act as an intellectual filter. This intellectual filter can help geographers select spatial attributes necessary for analysis and eventually to make decisions (De Mers, 1997). De Mers (1997:25) suggests that “as we experience space, we will encounter features and objects of many different types and we can use this experience to enhance our geographical skills such as viewing, analysing and understanding spatial patterns.”.

This ‘spatial language’ referred to in the previous paragraph was used to identify where and what a hotspot is. Definitions of ‘adventure’ and ‘adventure tourism’ are tabled, and key elements of the more applicable definitions are used to forge a type of ‘spatial language’. This ‘spatial language’ will guide which spatial attributes are needed to identify where the adventure hotspots are located in the province. As was mentioned in Chapter 2 (2.2), “adventure tourism usually involves people travelling **off the beaten track** into **fragile environments** and/or communities that are socially vulnerable” (Swartbrooke, 2003:196). Swartbrooke et al. (2003) suggest that the adventurer is attracted to exploration and discovery as the more important components of adventure. Smith & Jenner (1999:45) state that the essential ingredients of an adventure seem to include “a **remote**, **under-populated** region with a **traditional culture** where facilities are extremely limited”. Addison (1999:416, in Swartbrooke et al. 2003:29) states that “the threefold combination of activity, **nature** and culture marks adventure travel as an all-round challenge.” According to Millington et al. (2001:67), adventure travel is “*a leisure activity that takes place in an unusual, exotic, and remote or **wilderness** destination. It tends to be associated with high levels of activity by the participant, most of it outdoors, adventure travellers expect to experience various levels of risk, excitement and tranquillity, and be personally tested, in particular they are explorers of **unspoilt**, **exotic** parts of the planet and also seek out personal challenge.*”.

Next, the TKZN viewpoint on what adventure tourism is considered. As stated in the introduction, the KZN definition of adventure tourism is “a type of tourism which takes places in a destination which offers nature-based tourism but which in itself offers some measure of uncertainty, risk or increased levels of physical activity” (Kohler, 2004:7). The TKZN adventure tourism strategy further proposes that “adventure tourism is a type of tourism which takes place in a destination which offers **nature-based** tourism but which in itself offers some measure of uncertainty, **risk** or increased levels of **physical activity**” (Kohler, 2005:7). From the TKZN adventure strategies definition, the key element of **‘nature-based’** tourism was extracted as a further ingredient for the ‘spatial language’ associated with an adventure hotspot. Valentine, Weiler & Hall (1992, in Kohler, 2005:7) propose that nature-based tourism is primarily concerned with the direct enjoyment of some relatively **undisturbed** phenomenon of nature.

To summarise the discussion about the nature of adventure hotspots, it can be stated that the characteristics of the adventure **hotspot** have their origins in observations from the literature and the TKZN adventure strategy. From the above definitions, key elements of each definition were typed in bold. These will be used to add substance to the context or the 'spatial language' associated with defining a hotspot. The key elements that were extracted can be listed as **remote, traditional culture, nature, wilderness, unspoilt, exotic, nature-based, undisturbed, risk and physical activity**. These elements will be used to give meaning to the adventure hotspot. From this, the research concluded that adventure hotspots are areas that are richly endowed with natural resources and not located in close proximity to built-up areas and places of high population density. Adventure activities based around geographic features in these 'hotspots' can also provide an element of risk and physical challenge to the adventurer traveller. It is important to note that adventure tourism, although a new type of tourism, is already established in KZN (Kohler 2004) and some of the hotspots will have adventure tourism activities already underway. Therefore these hotspots could be either, 'existing adventure hotspots' or 'potential adventure hotspots'. To establish exactly which hotspots are 'existing' or have the 'potential' will require further research and will be briefly discussed in the final chapter.

3.2.2 Data requirements and sources

In order to identify hotspots, specific data was collected for analysis in a GIS. The challenge of defining a hotspot in the previous section allowed the research to direct the process of data gathering and not to get carried away with the masses of inter-related spatial data sets available. Berry (1995:13) stated that "the view (the next step) beyond data and information is order."

The preliminary step was to relate the definition of adventure hotspots to possible spatial layers that could be used to emphasise the definition of adventure travel hotspots. From the definition, two important assumptions are made that impact on the spatial data needs. Firstly, spatial data was needed to identify areas well

endowed with natural features and, secondly, areas that are distant from built-up areas.

The Environmental Potential Atlas (ENPAT) data series was obtained from the Department of Environmental Affairs and Tourism (DEAT) during the months of August and September 2008. These data consisted of a set of layers that is used in DEAT's GIS and which is available to academics and researchers. The ENPAT data series covers the whole of South Africa and has a number of layers that can be used separately, or in combination, to identify adventure hotspots. Over and above the ENPAT data series, two spatial layers (spatial information) were sourced from a private company (AfriGIS). The custodian of the data gave permission to use the data for this research. These layers are streets network (lines) and accommodation facilities. Two layers were geo-coded from a hardcopy map book; these layers were waterfalls and caves. Table 1.7 (Chapter 1) is an illustration of all the layers that were chosen with which to locate an adventure hotspot. What follows here is a more detailed explanation of each attribute and its importance to the research. Insight into the usefulness of each spatial attribute to the research definition of an adventure hotspot was gained from the DEAT ENPAT data custodians and TKZN practitioners in the early parts of 2009.

- **Accommodation locations**: An adventure hotspot is likely to be in proximity to a tourist accommodation location. The accommodation location is likely to be one of the last human infrastructural developments before entering into an adventure hotspot. To achieve the objective of finding adventure hotspots, it is necessary to remove all attributes linked to human activity from the equation. This will include the accommodation locations. Knowing where the accommodation is in proximity to the hotspots is also useful for future research and will be explained in Section 5.7.
- **Architectural sites**: The DEAT identified locations of architectural importance. These are in and around built-up areas and are of importance to the locals' current and past history. Although these sites can also be an attraction to conventional tourists, the adventurer is more interested in the natural outdoors. Therefore, to align the research with the definition of an adventure hotspot, it is necessary to identify

hotspots where there is no presence of architectural sites, since the adventurer is interested in hotspots that are completely natural.

- **Pebble, rocky and sandy beaches**: The DEAT delimited the different types of beaches along the South African coastline. These layers are useful to the adventurer, as they accurately identify where the ideal locations are for beach adventure activities. These activities include surfing, surf fishing, diving, snorkelling, wind and kite-surfing (among other adventure activities one can partake in on a beach).
- **Built-up areas**: This spatial layer identified the main urbanised and developed regions of the province. According to the research definition of an adventure hotspot, these built-up areas would need to be excluded from the process, since the research is interested in hotspots with no presence of human features.
- **Caves**: These features are normally off the beaten track and far away from developed areas. The caves are normally in a fragile state and vulnerable to mass tourism. It is likely that an adventure traveller would be eager to experience these locations by engaging in the hikes that lead up to the cave locations.
- **Conservation areas**: This layer demarcates all the areas that are protected by South African legislation. This layer is important to the adventurer, since he/she would be interested in natural areas that are untouched and preserved. Though there is likely to be human influence at these locations, the area is primarily focused on accentuating the natural qualities of the location. There are a number of activities the adventurer would be keen to partake in, such as game drives, hikes, climbing, photography tours and interaction with the locals, (among other adventure activities one can engage in or participate in, in a conservation area).
- **Fauna and flora features**: The ENPAT identified regions that have a variety of fauna and flora. These locations are of value to the adventurer who is attracted to locations where there is a variety of plants, flowers, vegetation and other flora species. They are also attracted to locations that have many animals, insects and other fauna species. A number of activities could unfold at these locations, such as game driving, photographic tours, hikes and many other adventure-related activities in the surrounding area.
- **Geological and natural features**: The study area is inundated with a variety of geological and natural structures. There are a number of activities in which the

adventurer could partake here, such as hiking, climbing, game viewing drives, climbing adventure sports, (among other adventure activities one can partake in, in a geological and naturally attractive area).

- **Mountains**: According to the research definition of an adventure hotspot, the adventurer is keen to visit areas that are natural and pristine. High (upper escarpments) and low (lower escarpments) mountain features are ideal for the adventurer, since they can be used for adventure sports such as climbing, paragliding, abseiling, hiking and other mountain-related adventure activities.
- **National heritage sites**: The ENPAT data series show many heritage sites that occur in a totally natural and pristine setting and have been given recognition as heritage sites from the DEAT. These sites could include famous battle fields along river beds or mountain ranges, which provide the backdrop for epic migratory treks. Adventurers may be interested to relive these historical moments by hiking, driving or just experiencing the areas in which they occur in their natural state.
- **Perennial water bodies**: There are a number of constructed and natural water bodies that are being used for water-related adventure activities. Activities such as boating, fishing and water sports can be enjoyed at such locations.
- **Rivers**: ENPAT mapped all the river features in the country. The adventurer is likely to be attracted to rivers where water-based adventure activities take place. These activities include river rafting, fishing and photography, among other water-based adventure activities.
- **Street network**: According to the definition, the adventure hotspot should be away from built-up areas. This is defined by the street network. By using these features as a mask towards the end of the analysis will result in retaining only those hotspots that do not have streets. It is therefore important to include this layer in the process so that those grid cells that have street features can be eventually removed during the final stages.
- **Waterfalls**: A waterfall is a unique feature in nature. Often adventure suppliers create adventure activities in and around the waterfalls, such as white-water rafting, gorge swinging and photographic tours (among other adventure activities one can partake at a waterfall site).
- **Wetlands**: These areas are major tourist attractions and the province is blessed with some of the most impressive wetlands in the world. The adventurer may be

interested in participating in a range of activities that may include fishing, bird watching, game drives and photographic tours (among other adventure activities one can partake in at a wetland site).

3.2.3 Data preparation

The ENPAT spatial data set, as well the spatial data from industry, was received in vector format. All spatial data were projected to the WGS84 latitude/longitude projection, and all layers were in Esri shapefile (.shp) format. The shapefile format is arguably the most recognised format found in the GIS industry. There are very few modern day GIS packages that cannot read a .shp file. The spatial data from the different sources were imported into the Maptitude GIS package. The software allowed the .shp files to be viewed on the GIS. It was, however, necessary to convert the shapefiles to the Maptitude format (.dbd) for editing and analysis. This was done for all attributes.

With all the imports complete, the next step was to structure the spatial data warehouse. The warehouse, in this respect, was a set of structured folders housed on Windows Explorer on a personal computer. Windows Explorer aids in efficiently storing the spatial data. Folders were created for the two groups of data, namely the human attribute data (H_Cultural as indicated in Figure 3.1) and natural attribute data (natural as indicated in Figure 3.1). All the translated .dbd files (see Table 1.7) were stored in their relevant locations according to the attribute groupings.

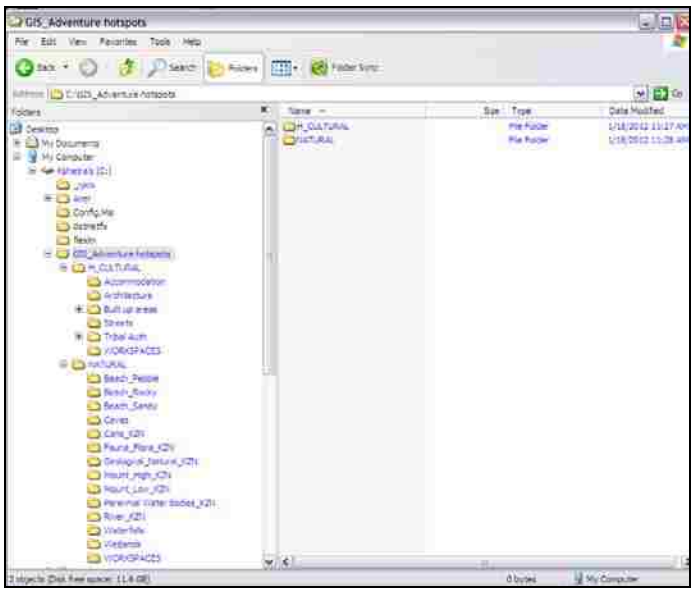


Figure 3.1: Screenshot: structure of data warehouse

The majority of the layers were already prepared for analysis and used as-is in the analysis process. Only the street layer had to be manipulated. The streets layer had to be modified to the 'spatial language' associated with the research definition of an adventure hotspot. According to the definition of an adventure hotspot, it is likely to be located 'off-the-beaten-track', away from built-up main roads and freeways. Therefore, the main freeways and highways were excluded from the analysis process. Only the gravel and secondary road features were included in the analysis, since these classes of 'streets' are considered to be in close proximity to the hotspots. These assumptions were discussed with the ENPAT data custodian and later verified in the questionnaire survey conducted with the KZN tourism practitioners.

3.2.4 Ordering the spatial data

Some of the applications using a GIS in the field of tourism were reviewed in Section 2.4.2. There are many related case studies proposing the use of a GIS in tourism planning. These case studies range from using a GIS as just a simple tool for visualising the tourist destination, to applying complex multi-criteria analysis (Van der Merwe, 2009) using spatial weights attached to each layer, which can be used to output different scenarios relating to the natural and built-up environment. Data structures, including those that are geographical in nature, have two certainties, "(1) tomorrow there will be new ones, and (2) what's good for one application isn't necessarily best for another" (Berry, 1995:102).

Spatial analysis involves many possible methods to model reality. It depends on 'what' needs to be achieved and the availability of data to achieve the 'what'. Most GIS packages these days are ambidextrous, having the capabilities to spatially analyse both vector and raster data (Berry, 1995). In this research, a vector-grid or vectorised cell approach was adopted, using a vector-based GIS (Maptitude). Similar approaches were adopted in Mauritius (Beedasy, 1999), Sri-Lanka (Boers & Cotrell, 2005) and Southern Illinois, USA (Xiao et al., 2002) using the vectorised cell approach.

In this research, a 5 km by 5 km grid cell was adopted. The total area of a grid is therefore 25 km². Figure 3.2 below graphically illustrates the grid structure adopted for this research.

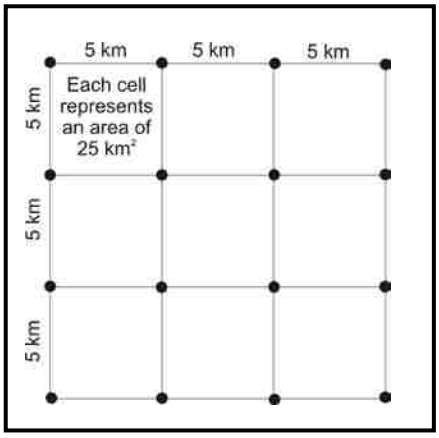


Figure 3.2: Vector grid

The next step was to bound the landscape phenomena into its main groups of human and natural features. Each individual feature type also had to be grouped into related layers (either points, lines or areas). According to the research definition of an adventure hotspot, it has certain natural and human attributes. Once the phenomena were grouped as natural or human features (as shown in Figure 3.1 above) a number of Structured Query Language (SQL) queries were executed on the individual feature types. The aim was to identify those cells that have an abundance of natural attributes and no presence of human attributes, thus accentuating the research definition of an adventure hotspot. The desired outcome of this approach was to maintain a consistent and uniform manner in which adventure hotspots are identified in KZN by using a GIS.

On the following pages the reader will find three tables that elaborate on the method adopted to identify an adventure hotspot. The details of the steps followed with the human attributes are discussed in Table 3.1. Table 3.2 explains the steps followed with the natural attributes. The overlaying process steps are elaborated on in Table 3.3.

Table 3.1: Method of analysis for the human attributes

Human attributes		
Steps	**Process name**	**Process description**
1	Overlay	This initial step prepared the vector grid layer with all the necessary columns required for the analysis that followed. The grid alphanumeric table was modified to include four columns (type integer) representing all four human attributes.
2	Count HGRID_Count	This step calculated the number of times a human attribute occurred in a single grid cell. The total was summed and inputted into the newly created human attribute columns of the grid table. Each grid stored the total count for each human attribute.
3	Reclass HGRID_Reclass	The previous step calculated the occurrence of all the human features per cell. If, for example, 20 accommodation points were present in a particular grid cell, the total would reflect 20. The vector-grid approach adopted in this research was more interested in the nominal representation of a human attribute. An SQL query was executed (SQL: 0 = 0 AND > 0 = 1) for each human attribute column. This resulted in the conversion of all values above 0 to 1. With regard to the above example, if there was a count of 20 accommodation points, the SQL query will now convert 20 to 1.
4	Count HGRID_R_Count	This step calculated the sum of all reclassified columns from the previous step. Another column was added to the grid layer called ‘Sum’ (type integer). All the reclassified columns created in the previous step were now added. The “Sum” column represented the total count of human attributes per grid cell. A ‘0’ suggests no presence of human features, and a total of four suggested a presence of all four human attributes.
5	Select HGRID_Select	According to the research definition of an adventure hotspot, an ideal hotspot has no presence or ‘null’ presence of human features. An SQL query was executed on the total column (SQL query: ‘Select all cells Where *Sum* < 1’), which selected all those grid cells with less than one count of human attribute.
6	Save	The last step for the human attributes was to save the selection set (Select all cells Where *Total* < 1) as a new layer. The output map will show only those grid cells that have no presence of human attributes.

Table 3.2: Method of analysis for the natural attributes

Natural attributes		
Steps	**Process name**	**Process description**
1	Overlay	Similarly to step one in the human attribute column, this initial step prepared the vector-grid layer with all the necessary columns required for the analysis that followed. The grid alphanumeric table was modified to include 15 columns (type integer) representing all 15 natural attributes.
2	Count NGRID_Count	This step calculated the number of times a natural attribute occurred in a single grid cell. The total was summed and inputted into the newly created natural attribute columns of the grid table. Each grid cell stored the total count for each natural attribute.
3	Reclass NGRID_Reclass	The previous step calculated the occurrence of all the natural features per grid cell. If, for example, 15 geological-natural attributes were present in a particular grid cell, the total would reflect 15. The vector-grid approach adopted in this research was more interested in the nominal representation of a natural attribute. An SQL query was executed (SQL: 0 = 0 AND > 0 = 1) for each human attribute column. This resulted in the conversion of all values above 0 to 1. With regard to the above example, if there were 15 geological natural attributes, the SQL query will now convert the 15 to 1.
4	Count NGRID_R_Count	This step calculated the sum of all reclassified columns. Another column was added to the grid layer called 'Sum' (type integer). All the reclassified columns created in the previous step were now added. The 'Sum' column represented the total count of natural attributes. A '0' suggests no presence of natural attributes and '15' suggests that all 15 of the natural attributes are present.
5	Select NGRID_Select	According to the research definition of an adventure hotspot, an ideal hotspot has a high presence of natural attributes. An SQL query was executed on the total column (SQL: 'Select all cells Where *Sum* ≥ 5'), selecting all those cells with five or more natural attributes per column. This SQL query was executed for all 15 natural attributes. The value 5 was decided on after • discussions with tourism practitioners from TKZN and DEAT, • visual inspection of TKZN maps, • a review of adventure tourism documentation from TKZN, and • personal observations.
6	Save	The last step for the natural attributes was to save the selection set (Select all cells Where *Total* ≥ 5) as a new layer. The output map showed the spatial distribution of grid cells across the province. The empty spaces on the map suggest that these areas had a count of less than five natural attributes and thus do not align with the research definition of an adventure hotspot.

Table 3.3: Method of analysis for the overlay process

Steps for overlay		
Steps	**Process name**	**Process description**
1	Overlay	The aim of this step was to overlay the two output grid maps created from the process implemented on the human and natural data groups. Both output maps have blank regions. These blank regions are those areas that do not comply with the research definition of an adventure hotspot.
2	Hotspot identification	This final step used an SQL query (SQL query: 'Where HGRID_Select and NGRID_Select = 1') to 'select' those cells from the two output maps where a grid cell from the human attribute map overlaid exactly on a grid cell from the natural attribute map. The new selection set is those grid cells that match the research definition of an adventure hotspot, since they can be described as those grid cells that have a high count of natural features (equal to five or greater than five of the natural attributes per cell) and a null count of human features (count of 0 human attributes per cell).

The results of the methodology referred to here are discussed in Section 3.2. A number of figures, tables and appendices were used to interpret the findings.

3.3 Results of the GIS process

The data layers were imported and manipulated in the GIS application, and the output maps were validated by means of a questionnaire completed by the KZN tourism practitioners. Two spatial layers were added to the database in the GIS application after the first five interviews, namely waterfalls and caves. This resulted in a total of 263 grid cells being identified. Briefly; the geographical analysis required a hotspot to consist of a zero (null) count of human features and a high count of natural features. The flow described here is graphically illustrated in Appendix 2. In the following section the steps carried out on the various layers in the GIS application are interpreted.

Before the identification of hotspots can be done, a 5 km × 5 km blank vector grid layer had to be created. The GIS package used (Maptitude) created vector grids based on user input options. Each cell will therefore cover an area of 25 km^2. The map of KwaZulu-Natal was overlaid with this grid (as represented in Figure 3.3). The data generated in Section 3.1.2 was divided into two sets representing the human and natural features. Each of these two sets was manipulated individually. Output maps were created before the final step in which the two output maps were overlaid.

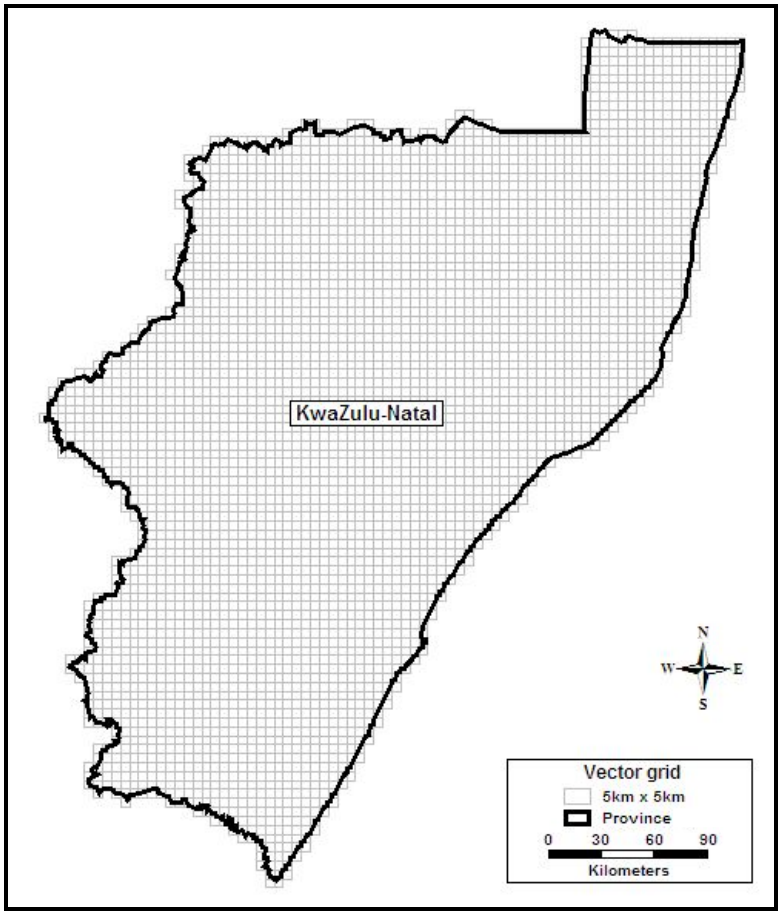


Figure 3.3: KZN vector-grid layer

3.3.1 Results of the applied GIS methodology for the human features

Each of the four spatial layers representing the human features (built-up area, streets, architecture and accommodation), were **overlaid with the vector-grid**. This resulted in the creation of attribute columns for each of the spatial layers in the alphanumeric table of the vector-grid layer — an example of the table structure, as well as an extract from the table, is provided in Appendix 3. These columns indicate the number of human features located in each of the grid cells. The main reason for this overlaying was to locate areas (grid cells) that have no human features (the count for all four features should thus be equal to 0). These areas or grid cells represent remote areas away from all man-made features, which are areas that attract the adventurer. H1 in Appendix 2 represents this step in the GIS flow diagram.

A **count** was performed on each of the human attribute columns to determine the frequency of each of the human attributes per grid cell. The results were populated in

the attribute columns of the alphanumeric table of the human vector-grid layer (as shown in step H2 of the GIS flow diagram in Appendix 2). Table 3.4 represents an extract from the alphanumeric table after the 'count' command has been executed. The count was performed to identify those grid cells that have no human features. Two rows are highlighted in Table 3.4. The first row (indicated by the star symbol) represents a grid cell with no presence of human features. The second row (indicated by the cross symbol) identifies 28 street features in a particular grid cell. It is likely that the grid cell indicated by the cross falls in an urban area. This grid cell was excluded from the final results, since the aim was to identify grid cells with no human features.

Table 3.4: Count of human features per grid cell

Col_Name	Row_Name	[Built up areas]	Streets	Architecture	Accom_	BUILTUP_1_
EV	85	0	0	0	0	0
EV	84	0	4	0	0	0
EV	83	0	7	0	0	0
EW	84	0	0	0	0	0
EV	82	0	7	0	0	0
EW	83	0	0	0	0	0
EU	85	0	4	0	0	0
EU	84	0	7	0	0	0
EU	83	0	5	0	0	0
EU	82	0	0	0	0	0
ET	85	4	28	1	1	1
ET	84	1	0	1	0	1
ET	83	0	0	0	0	0
ET	82	0	0	0	0	0
ES	85	1	11	2	1	1
ES	84	1	11	1	0	1
ES	83	0	0	0	0	0
ES	82	0	0	0	0	0
ER	85	0	0	1	0	0
ER	84	0	8	0	0	0

The next step was to **reclassify** each of the attribute columns created in the previous step into a nominal scale (as represented by H3 in Appendix 2). This process made it possible to map the occurrence of human features per grid cell. A duplicate set was created of the human data attribute columns — the count column is highlighted by light blue and the duplicate set by light red in Table 3.5. A reclassification was done on each of the human attribute columns. An SQL query was executed ('0 = 0 AND > 0 = 1') to keep any value identified as 0 (no presence of human features) as 0 and to convert any value greater than 0 to 1. This SQL query was executed for all four of the human attributes in the alphanumeric table. It can be

seen from Table 3.5 that the row highlighted in purple shows that the SQL query (0 = 0 AND > 0 = 1) kept the values at 0 from the count columns (highlighted in light blue in Table 3.5) through to the duplicate reclassification columns (highlighted in light red in Table 3.5). Conversely, the row highlighted in green in Table 3.5, converted all those values greater than 1 in the count columns (highlighted in light blue in Table 3.5) to a value of 1 in the duplicated reclassified columns (highlighted in light blue in Table 3.5).

Table 3.5: Reclassification of the human attribute vector-grid alphanumeric table

Area	Description	Col_Name	Row_Name	[Built up areas]	Streets	Architecture	Accommodation	[ID:1]	Built_up_1_0	Streets_1_0	Arc_1_0	Accom_1_0	SUM
25.18 EV85		EV	85	0	0	0	0	30738	0	0	0	0	0
25.20 EV84		EV	84	0	4	0	0	30737	0	1	0	0	1
25.21 EV83		EV	83	0	7	0	0	30736	0	1	0	0	1
25.20 EW84		EW	84	0	0	0	0	30940	0	0	0	0	0
25.22 EV82		EV	82	0	7	0	0	30735	0	1	0	0	1
25.21 EW83		EW	83	0	0	0	0	30939	0	0	0	0	0
25.23 EV81		EV	81	0	2	0	0	30734	0	1	0	0	1
25.22 EW82		EW	82	0	6	0	0	30938	0	1	0	0	1
25.21 EX83		EX	83	0	0	0	0	31142	0	0	0	0	0
25.18 EU85		EU	85	0	4	0	0	30535	0	1	0	0	1
25.20 EU84		EU	84	0	7	0	0	30534	0	1	0	0	1
25.21 EU83		EU	83	0	5	0	0	30533	0	1	0	0	1
25.22 EU82		EU	82	0	0	0	0	30532	0	0	0	0	0
25.23 EU81		EU	81	0	0	0	0	30531	0	0	0	0	0
25.18 ET85		ET	85	4	20	1	1	30332	1	1	1	1	4
25.20 ET84		ET	84	1	0	1	0	30331	1	0	1	0	2
25.21 ET83		ET	83	0	0	0	0	30330	0	0	0	0	0
25.22 ET82		ET	82	0	0	0	0	30329	0	0	0	0	0
25.23 ET81		ET	81	0	0	0	0	30328	0	0	0	0	0
25.18 ES85		ES	85	1	11	2	1	30129	1	1	1	1	4
25.20 ES84		ES	84	1	11	1	0	30128	1	1	1	0	3
25.21 ES83		ES	83	0	0	0	0	30127	0	0	0	0	0
25.22 ES82		ES	82	0	0	0	0	30126	0	0	0	0	0
25.23 ES81		ES	81	0	0	0	0	30125	0	0	0	0	0
25.18 ER85		ER	85	0	0	1	0	29926	0	0	1	0	1
25.20 ER84		ER	84	0	8	0	0	29925	0	1	0	0	1

Once the reclassification step was completed, the totals were summed. Appendix 4 illustrates the steps (1, 2 and 3) performed in the GIS. A column called ‘Sum’ was included in the alphanumeric table of the vector-grid layer. Table 3.5 represents an extract from the alphanumeric table. The block highlighted in yellow in Table 3.5 shows the results of the **count** command on the reclassified columns (highlighted in pink in Table 3.5). The result of the above process is illustrated graphically in Figure 3.4. The area highlighted by the black square in Figure 3.4 is located in close proximity to the city of Durban. The corresponding entry in the alphanumeric table is highlighted in purple in Table 3.5. It is clear from the alphanumeric table that all the human attributes are presented in the table entry (the block highlighted in green, Col_Name ET, Row_Name 85 in Table 3.5). This is not the ideal location for an adventure activity. Thus, the research aimed to find those areas (grid cells) where no

human features were present. This would be all the 0s in the SUM column, highlighted in yellow in Table 3.5 above. Graphically, the 0s are mapped in light blue in Figure 3.4. The intension was to locate those cells where no (zero) human attributes were present (as illustrated in light blue in Figure 3.4 below), suggesting that no (null or zero) human attributes are present. This step is represented by H4 in Appendix 2.

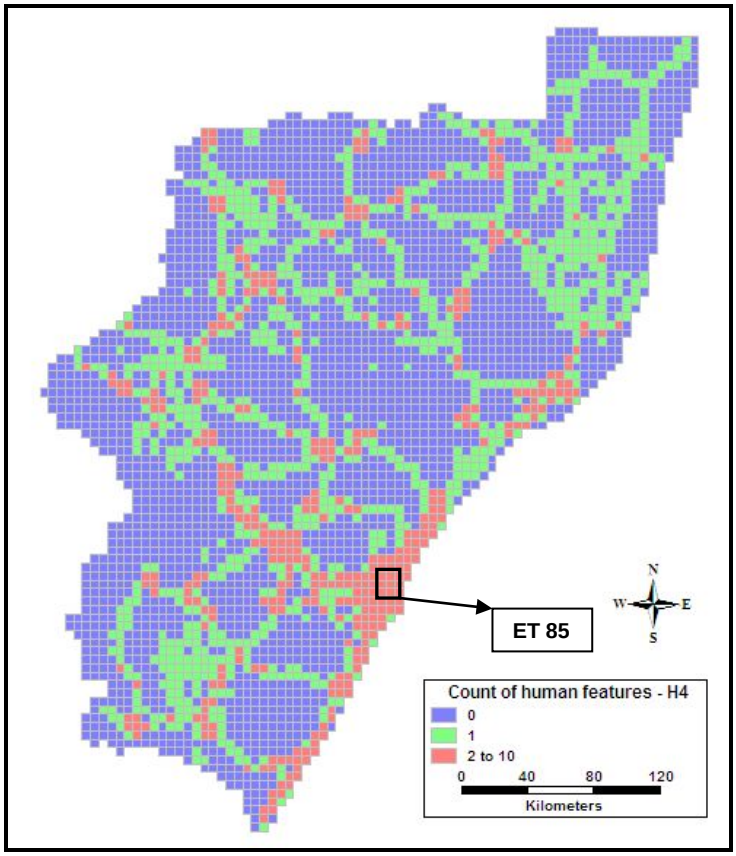


Figure 3.4: Map showing the count of human features per vector-grid cell

An SQL query (Select all cells where 'Sum' < 1) was executed on the 'Sum' column of the previous step (the column highlighted in yellow in Table 3.5). This SQL query identified all those areas (grid cells) that had no count of any human features, and excluded those areas (grid cells) where any human attributes were present from the map. The result of the above process is illustrated graphically in Figure 3.5, and shown in the GIS flow diagram as H5 in Appendix 2. The last step regarding the human attributes was to save the selection set as a new layer in order for it to be overlaid with the output map from the natural layer data group (represented by H6 in

Appendix 2) The process implemented on the natural layers is discussed in the next section.

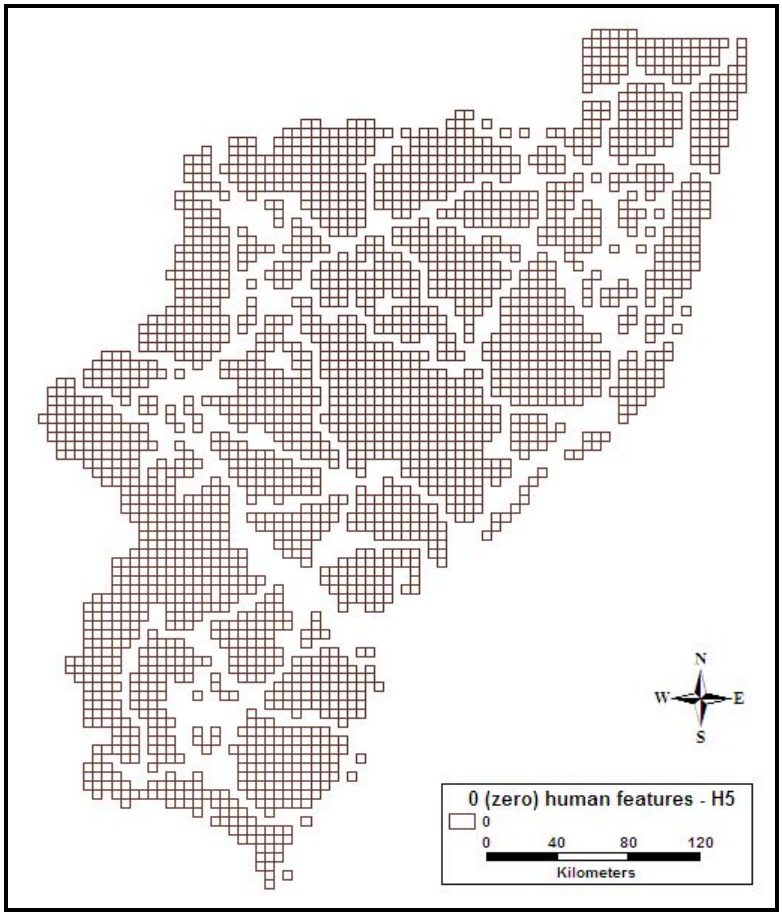


Figure 3.5: Grid cells with no presence of human features

3.3.2 Preparation of the natural features

The process adopted for the natural features was similar to that for the human features. All 15 spatial layers (refer to Table 3.6 for a detailed listing of all the natural features) representing the natural features were **overlaid with the vector grid**. This resulted in the creation of attribute columns for each of the spatial layers in the alphanumeric table of the vector grid layer — see Appendix 5 for an example of the table structure, as well as an extract from the alphanumeric table. These columns indicate the number of natural features located in each of the grid cells. The main reason for this overlaying was to locate areas (grid cells) that have a high count of natural features (the count for each grid cell must be equal to or more than 5). These areas or grid cells represent areas that are rich in natural features and that are likely

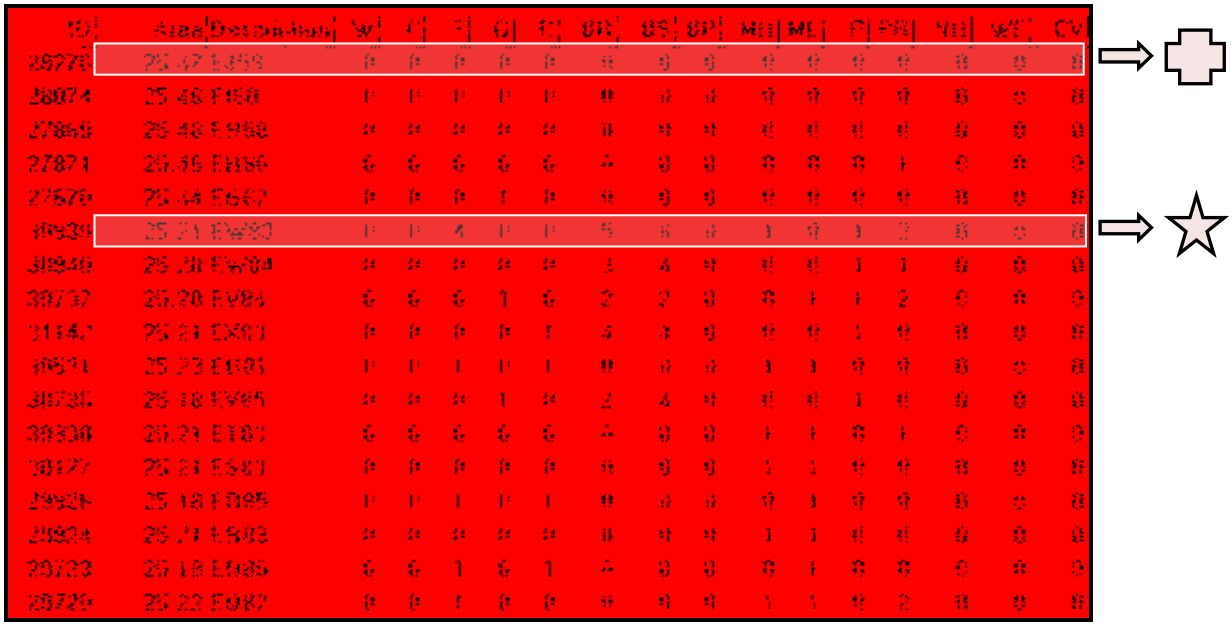
to host an adventure activity. The steps, as it appears in the GIS flow diagram, are highlighted in N1 (see Appendix 2).

Table 3.6: Natural spatial features in the GIS

Spatial layer name	**Data type**
Wetlands	Integer
Conservation areas	Integer
Caves	Integer
Fauna and flora sites	Integer
Geological areas	Integer
Rivers	Integer
Rocky beaches	Integer
Sandy beaches	Integer
Pebble beaches	Integer
High mountains	Integer
Low mountains	Integer
Plains	Integer
Waterfalls	Integer
Perennial river bodies	Integer
Natural cultural heritage sites	Integer

A **count** was performed on each of the attribute columns of the natural features to determine the number of times each natural attribute occurred in a grid cell. The results were populated in the attribute column of the alphanumeric table of the natural vector-grid layer (as represented in step N2 of the GIS flow diagram in Appendix 2). Table 3.7 represents an extract from the alphanumeric table after the 'count' command had been executed. The main reason for performing this count was to identify those grid cells that have a high presence of natural features. Table 3.7 highlights two rows. The row annotated by the star symbol has a variety of natural features present and is ideal for an adventure hotspot — Appendix 5 contains the abbreviation table for the natural attributes in Table 3.7. The row indicated by the cross symbol in Table 3.7 has no presence of natural features; it is thus not a likely spot for an adventure activity. This grid cell, having no presence of natural attributes, were excluded from the eventual hotspot map, since the adventurer is interested in areas (grid cells) with a high presence of natural features.

Table 3.7: Count of natural features per grid cell



The next step was to reclassify each of the attribute columns created in the previous step into a nominal scale (see N3 in Appendix 2). This process made it possible to map the occurrence of natural features per grid cell. A duplicate set was created for the natural attribute columns — the count column is highlighted in light blue and the duplicate set in pink in Table 3.8. A reclassification was done on each of the natural attribute columns. An SQL query was executed (0 = 0 AND > 0 = 1) to keep any value identified as 0 (no presence of natural features) as 0 and to convert any value greater than 1 to 1. The SQL query was executed for all 15 natural attributes. Table 3.8 illustrates that:

- with regards to the row highlighted in green, the SQL query retained all the 0's (zero's) in the light blue section of the table — the reclassified columns (the pink section of the table) have been populated with 0's (zero's).
- with regards to the row highlighted in purple, the SQL query reclassified all the values > 0 in the light blue section — the reclassified columns (the pink section of the table) have been populated with 1's.

Table 3.8: Count of natural features per grid cell

Area	Description	W	C	F	G	R	BR	BS	BP	MH	ML	P	PR	NH	WF	CV	[ID:1:1]	[W:1]	[C:1]	[F:1]	[G:1]	[R:1]	[BR:1]	[BS:1]	[BP:1]	[MH:1]	[ML:1]	[P:1]	[PR:1]	[NH:1]	SUM_N
25.47	EJ59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28276	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.46	EI60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28074	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.48	EH58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27869	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.46	EH60	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	27871	0	0	0	0	0	0	0	0	0	0	0	1	0	1
25.44	EG62	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	27670	0	0	0	1	0	0	0	0	0	0	0	0	0	1
25.21	EW83	0	0	4	0	0	5	6	0	1	0	1	2	0	0	0	30939	0	0	1	0	0	1	1	0	1	0	1	1	0	6
25.20	EW84	0	0	0	0	0	3	4	0	0	0	1	1	0	0	0	30940	0	0	0	0	0	1	1	0	0	0	1	1	0	4
25.20	EV84	0	0	0	1	0	2	2	0	0	1	1	2	0	0	0	30737	0	0	0	1	0	1	1	0	0	1	1	1	0	6
25.21	EX83	0	0	0	0	1	4	4	0	0	0	1	0	0	0	0	31142	0	0	0	0	1	1	1	0	0	0	1	0	0	4
25.23	EU81	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	30531	0	0	1	0	1	0	0	0	1	1	0	0	0	4
25.18	EV85	0	0	0	1	0	2	4	0	0	0	1	0	0	0	0	30738	0	0	0	1	0	1	1	0	0	0	1	0	0	4
25.21	ET83	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	30330	0	0	0	0	0	0	0	0	1	1	0	1	0	3
25.21	ES83	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	30127	0	0	0	0	0	0	0	0	1	1	0	0	0	2
25.18	ER85	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	29926	0	0	1	0	1	0	0	0	0	1	0	0	0	3
25.21	ER83	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	29924	0	0	0	0	0	0	0	0	1	1	0	0	0	2
25.18	EQ85	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	29723	0	0	1	0	1	0	0	0	0	1	0	0	0	3
25.22	EQ82	0	0	1	0	0	0	0	0	1	1	0	2	0	0	0	29720	0	0	1	0	0	0	0	0	1	1	0	1	0	4

Once the reclassification was completed, the totals were summed (refer to 1, 2 and 3 in Appendix 4 to see the flow of the process in the GIS), and included in a new column called ‘Sum’ (represented by N4 in Appendix 2). Table 3.8 represents an extract from the alphanumeric table. The rows highlighted in yellow show the results of the **count** command on the reclassified columns (highlighted in pink in Table 3.8). The result of the above process is illustrated graphically in Figure 3.6. The areas highlighted by the black square (EW 83) in Figure 3.6 below is located in close proximity to the South Coast — the corresponding entry in the alphanumeric table is highlighted in purple in Table 3.8. It is clear from the alphanumeric entry that there is a high presence of natural features in this area (grid cell). It is areas like these that fit the research definition of an adventure hotspot. According to the adopted definition of an adventure hotspot, the value 5, or greater than 5, was adopted as a benchmark for a possible adventure area (grid cell). Graphically, the 0s are mapped in blue in Figure 3.6 below. According to the research definition, the research is interested in the pink areas on the map, which show cells with a count of 5 or more for the presence of natural phenomena.

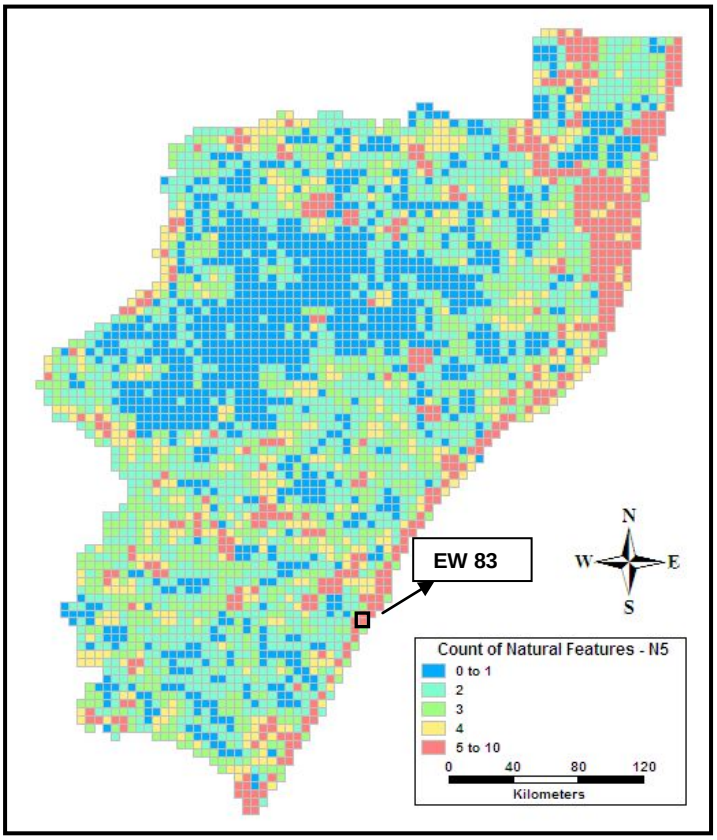


Figure 3.6: The count execution of human features per vector-grid cell

The research aimed to identify those areas (grid cells) with a high presence of natural features. The results of the questionnaire survey confirmed that the threshold of five or more counts of natural features per area (grid cell) is an accurate indication of clustering. The results are discussed in Section 3.3 below. An SQL query (Select all cells Where ‘Sum’ ≥ 5) was executed on the ‘Sum’ column from the previous step (represented by N5 in Appendix 2). This SQL query identified all those grid cells that had a count of 5 or more natural features per grid cell. The result of the above process is illustrated graphically in Figure 3.7. A final step for the natural attributes data group was to save the selection set as a new layer so that it could be overlaid with the output map from the human data group in the final step (represented by N6 in Appendix 2). This final step is discussed in the next section.

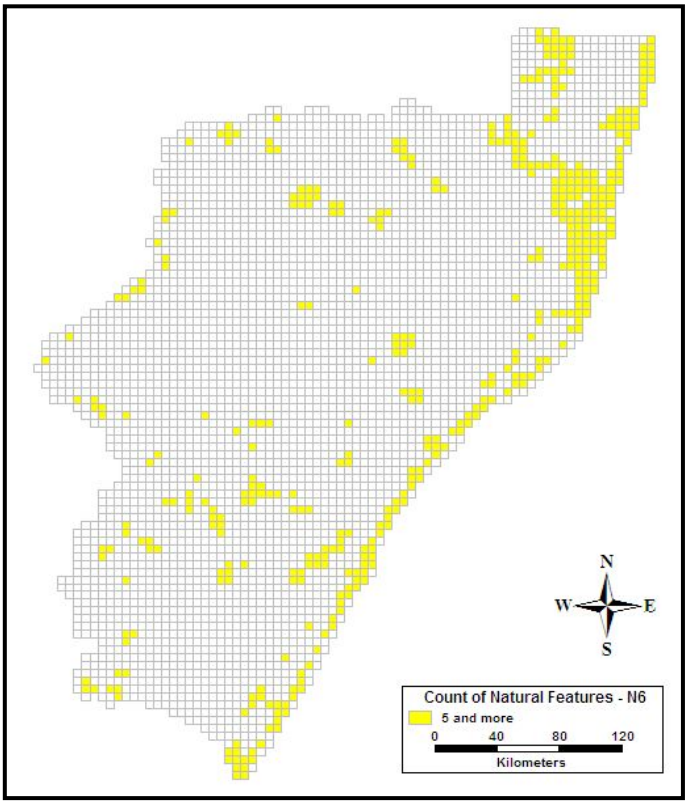


Figure 3.7: The grid cells with a high presence of natural features

3.3.3 Identification of adventure hotspots

The purpose of this step was to overlay the two output maps created from the steps executed on the human and natural attribute data groups. The remaining areas (grid cells) of the human data group were areas with no presence of human features. The remaining areas of the natural data group were areas with a high presence of natural features.

Figure 3.8 illustrates the combination (overlaying) of all the identified human and natural features (represented by H6 and N6 in Appendix 2). As a final step an adventure hotspot map (Figure 3.9) was created showing the cells where the count of natural features were ≥ 5 **and** the count of human features were 0 (zero). A total of 263 grid cells were thus identified as cells that meet the definition of an adventure hotspot (as represented by HN6 in Appendix 2).

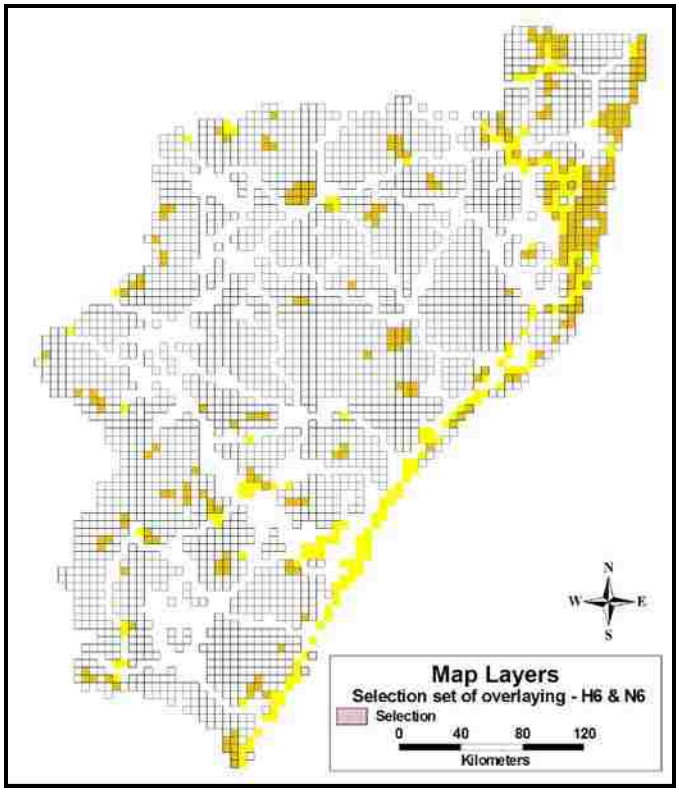


Figure 3.8: The newly selected grid cells after overlaying human and natural features

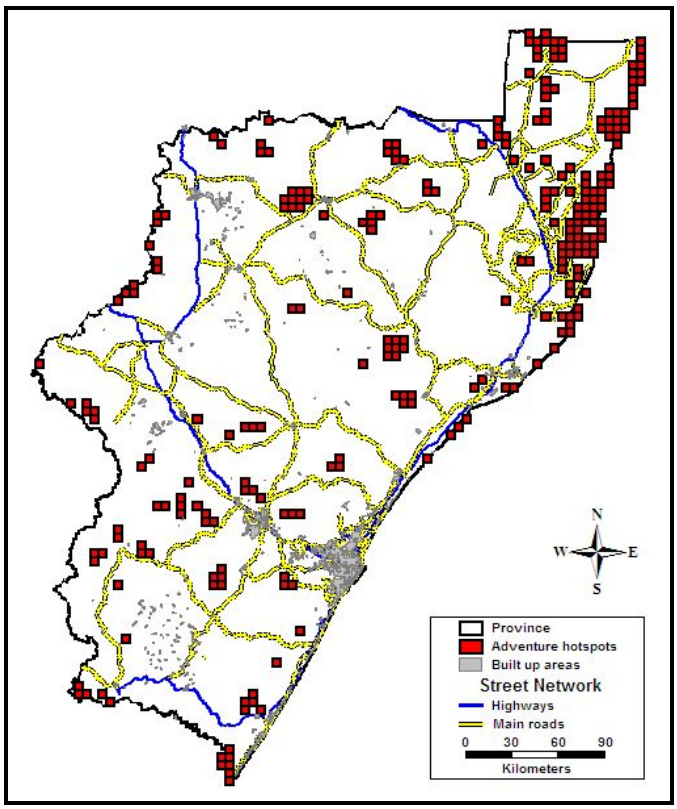


Figure 3.9: Adventure hotspots in KZN

Sections 3.2 and 3.3 sought to locate adventure hotspots in KZN. To achieve this, a thorough understanding of adventure tourism was essential. From the definition, the following important guiding terms were identified: remote, traditional culture, nature, wilderness, unspoilt, exotic, nature-based and undisturbed. The next step was to collect relevant spatial attributes relating to the components identified above. This was followed by the vector grid analysis of the two data groups, namely human and natural features. The next section validates these findings and adds valuable knowledge about adventure hotspots in KZN.

3.4 Interpretation of questionnaire/validation of hotspots

Assumptions about the methodology applied to create the hotspot map, led to a sense of uncertainty with regard to the validity of the findings. Standard research practice advises a validation of the methodology and findings. In order to address these uncertainties and to move from a theoretical understanding of adventure hotspots to a more practical and acceptable meaning that could be of value to the KZN adventure tourism environment, the researcher targeted local experts working in the KZN tourism field. These local experts could potentially identify the accuracies and inaccuracies in the final map showing the distribution of hotspots. A questionnaire survey was conducted to establish the opinions of the local experts.

3.4.1 Purpose and broad structure of questionnaire

The primary objective of the questionnaire survey was to use the expert knowledge of local tourism practitioners in order to evaluate the spatial distribution of hotspots identified by the GIS. The secondary objective of the questionnaire survey was to gather perceptions with regard to sustainable planning at identified adventure hotspots.

The questionnaire (see Appendix 1) consisted of qualitative as well as quantitative questions. A summary of the focus of the 14 questions included in the questionnaire used for this study is provided below.

- **Questions 1 to 3** focused on the background profiles of the respondents.
- **Questions 4 to 6** focused on the perceptions of the respondents regarding the applied research methodology and the spatial distribution of identified hotspots.

- **Questions 7 to 14** focused on the perceptions of the respondents with regard to planning for sustainable tourism at identified hotspots.

Before the respondents from KZN completed the questionnaire survey, it was successfully piloted on colleagues from UNISA at a research workshop.

3.4.2 The respondents

It was essential to construct a sample representative of all KZN tourism regions. The researcher received cooperation from the TKZN Information Systems Manager (ISM). The researcher had an appointment with the ISM manager regarding the questionnaire. This appointment was primarily for the ISM manager to review the questionnaire. The questionnaire was refined after receiving constructive criticism from the ISM. The ISM proposed using the Provincial Tourism Forum (PTF) members as respondents. The ISM provided a database of possible respondents and the name of the most senior person in each region. The ISM manager also provided a covering letter (see Appendix 6) which served as an introduction to the research and as a motivation for potential respondents to participate in the survey. The researcher made phone calls to the most senior persons on the list for each of the eight regions. The ISM manager further identified four additional individuals because of their experience of tourism in the province as a whole. The respondents had thus been identified using a purposive sampling method.

3.4.3 Conducting the survey

The first five interviews were held in KZN over the course of a few weeks after the meeting with the ISM. They were conducted on a face-to-face basis at agreed on destinations during July 2009. The remaining seven interviews were conducted telephonically from Pretoria during September 2009.

The duration of a face-to-face interview was approximately 90 minutes. The steps below elaborate on the procedure followed for each face-to face interview.

- An initial phone conversation was conducted with the respondent during which a meeting time and location were confirmed.
- Prior to the start of the meeting, permission was requested to record the interview.

- Each interview started with a brief overview of the research problem and the researcher's personal motivation for doing the research.
- The chronology of the applied GIS analysis was then explained by using a flow chart (see Appendix 2).

After the face-to-face interviews, it took three months to complete the remaining seven telephonic interviews due to finding appropriate meeting times with the remaining respondents. The approximate duration of telephone interviews was 50 minutes. A reason for the time difference with regard to the face-to-face interviews could be the impersonal nature of a face-to-face conversation. The steps below elaborate on the procedure adopted for each telephone interview.

- During the initial conversation with the respondent, the researcher introduced the research problem and the motivation for doing the research.
- The necessary documentation was then emailed to the respondent.
- A follow-up phone conversation with the respondent confirmed a date and time.
- The telephonic interviews adopted exactly the same steps as mentioned in the section relating to the face-to-face interviews.

The following differences between the face-to-face interviews and the telephonic interviews need to be pointed out:

- certain attachments were emailed to the respondents in preparation for the telephonic interviews.
- in response to the feedback received from the initial five respondents, two additional spatial layers, caves and waterfalls, were added to the GIS application; and
- the input of one respondent could not be recorded due to the malfunctioning of the recording device on the day.

The aim of the survey was to verify the correctness of the spatial distribution of identified hotspots. This is in agreement with Berry's (1995) detailed discussion about how maps create a truthful picture. He states that "to present a useful and truthful picture, an accurate map must tell white lies". He goes on to state that "a

responsible map maker will identify where the map is most accurate and where it is least accurate" (Berry, 1995:53).

3.5 Results of questionnaire responses

The feedback that was quantitative in nature was captured and analysed in Microsoft Excel. The qualitative responses were interpreted, summarised and included in this section. For ease of reading, the relevant questions from the questionnaire have been extracted and included in the text.

3.5.1 Background information of respondents

The purpose of this section was to put the following in perspective:

- the respondents' region of expertise (Question 1);
- their work position (Question 2); and
- how much experience they gathered in the field of tourism (Question 3).

Question 1

1. In which of the tourist regions (as identified by TKZN) are you actively working in? Please tick the relevant box or use 1.9 to specify an option that is not available.

1.1	Battlefields	
1.2	Zululand	
1.3	Pietermaritzburg/Midlands	
1.4.	South Coast	
1.5.	UKhahlamba Drakensberg	
1.6.	North Coast	
1.7.	Elephant Coast	
1.8.	Durban	

1.9. Other, please specify,

As illustrated in Table 3.9, the expertise of eight of the 12 respondents was confined to the eight tourist regions (as expected). Four respondents had expertise in all the regions.

Table 3.9: Regions of expertise of respondents

	TKZN regions							
Respondent	1.1 Battlefields	1.2 Zululand	1.3 Midlands	1.4. South Coast	1.5. Drakensberg	1.6. North Coast	1.7.Elephant Coast	1.8 Durban
1	•	•	•	•	•	•	•	•
2	•	•	•	•	•	•	•	•
3								•
4	•	•	•	•	•	•	•	•
5						•		
6	•							
7					•			
8	•	•	•	•	•	•	•	•
9		•						
10			•					
11							•	
12				•				

Question 2

Which of the options below best describes your job title, please tick the relevant box or specify in 2.7.

2.1	Tourism Destination management officer	
2.2	Management	
2.3	Personal assistant	
2.4	Consultant	
2.5	Researcher	
2.6	Tour operator	

2.7. Other, please specify,

All 12 respondents held positions in management (refer to Table 3.10). Four of the respondents were tourist destination management officers in the local government, four were research managers, and two were tour operator managers. One of the respondents was a consultant, another an information systems manager, and the last one an assistant director.

Table 3.10: Job titles of respondents

	Job title						
Respondent	2.1 Tourism Destination management officer	2.2 Management	2.3 Personal assistant	2.4 Consultant	2.5 Researcher	2.6 Tour operator	2.7 Other
1		•			•		Information systems manager
2		•			•		
3		•			•		
4		•			•		
5	•	•					
6		•				•	
7		•				•	
8		•					
9	•	•					Assistant director
10	•	•					
11	•	•					
12		•		•			

The researcher is of the opinion that the seniority of the respondents contributed to the validity of the survey. Their wealth of experience and knowledge of the KZN tourism scene also added value to the gathered data.

Question three

3. How long have you been working in the tourism sector. Enter a value into the box provided below.

The purpose of this question was to highlight the working experience of the sample of 12 respondents. The length of the working experience of the respondents are summarised in Figure 3.10. The number of years varied between 22 years and six years - a range of 16 years.

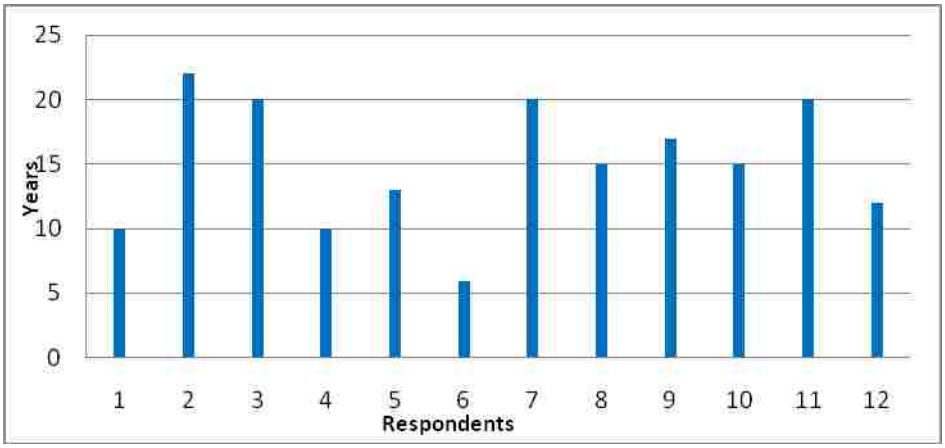


Figure 3.10: Respondents' experience in the tourism sector

It can be concluded that the 12 PTF members gave credibility to the overall worth of the results from the questionnaire, given their experience (as discussed in question 2 above) and length of working in the tourism sector in KZN.

3.5.2 Results from the validation of research methodology

The purpose of questions 4 to 6 was to

- measure the respondents' perceptions of the research methodology adopted,
- tap in on the local knowledge of the respondents in order to identify and locate additional areas perceived by the respondents as being hotspots worthy of inclusion,
- identify those hotspots that were truly new to the respondents, and
- discuss and ascertain the respondents' perceptions of sustainable planning practices in remote pristine areas.

Question 4

Refer to map 1*. On a scale of 1 – 5, do you agree with the procedure applied (as explained in the presentation) to identify adventure hotspots in the KwaZulu-Natal Province?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

* **Note**: map 1 is similar to the map shown as Figure 3.9 (the map of adventure hotspots)

This question was arguably the most important, since it evaluated the methodology adopted to identify hotspots. A five-point Likert scale was used, with 1 representing

'strongly disagree' and 5 representing 'strongly agree'. In the histogram shown in Figure 3.11 the responses are summarised.

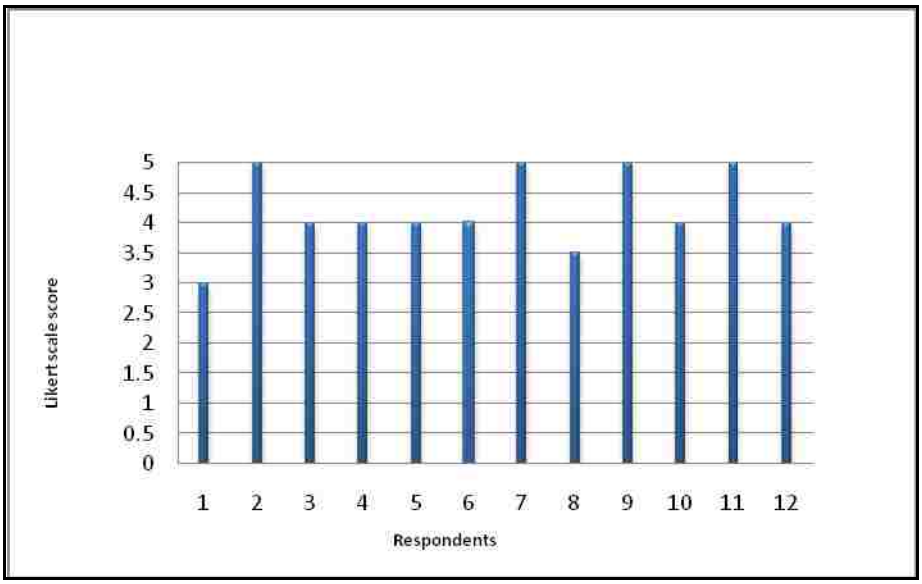


Figure 3.11: Satisfaction of respondents with the research methodology

The average of 4.2 (1 to 5 – Likert scale) suggests that the respondents are generally satisfied with the research methodology. This shows an overall satisfaction rate of 84% with the research methodology used to identify the adventure hotspots.

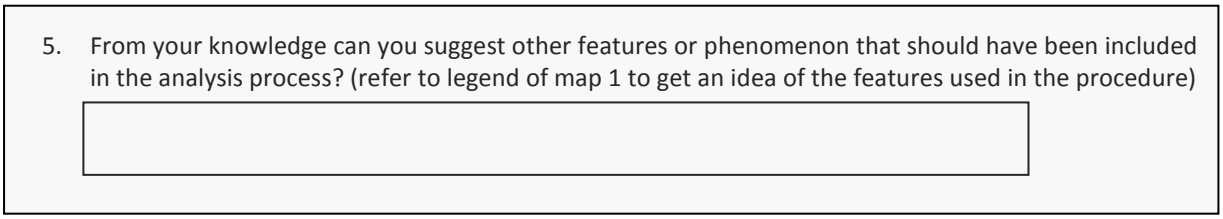
A few interesting comments were noted during the respondents' discussions about the question. These comments are summarised below.

Respondent 1 was more familiar with identifying hotspots using exact pin-point location identification in a vector GIS and not the vector-grid approach adopted by the researcher. The respondent did not see or study the approach adopted by the researcher and was ambivalent about it. The respondent did, however, state that academics involved in geographical research have the ability to generate new ideas in their respective fields, and that these ideas should not be shot down before they had been tried and tested. The respondent further mentioned the difficulty that some tourism authority members may have in grasping the concept of a GIS, since many of them are not GIS-literate.

Respondent 2 commented on the grid size, stating that it was appropriate. She further suggested delimitations in the identified hotspots. The respondent stated that she was impressed with the methodology and output maps. In the past, she mentally pictured the hotspots, but it was the first time she had actually seen the identification done. The respondent was concerned with the Drakensberg region and suggested adding layers such as hiking trails and the World Heritage Sites to the GIS application. These layers could enhance the hotspots in the Drakensberg region.

Respondent 7 was not entirely satisfied with the hotspots identified in the Drakensberg region, yet was still satisfied with the methodology adopted to identify hotspots. The respondent suggested making the entire Drakensberg region a hotspot, given its World Heritage Status.

Question 5



This question provided insight into other features or phenomena that the respondents perceived could improve the accuracy/validity of the GIS application. Table 3.11 summarises the responses. The feedback on this question highlighted the latent knowledge that each respondent had in relation to tourism and adventure tourism in the region. The researcher noted a few interesting responses, which are summarised after Table 3.11.

Table 3.11: Features or phenomena missing from the GIS application

Respondent	Feature or phenomenon missing
1	• Existing adventure hotspots • Tribal areas • Private and state farms
2	• Diving spots along the Indian Ocean • Hiking trails in especially the Drakensberg region • Tribal areas • Hiking trails
3	• Wind speed model • Private and state farms
4	• Private and state farms • Tribal land
5	• Bird species, especially migrating birds • Private and state farms, especially sugar cane farms
6	• Private and state farms
7	• Existing hotspots • World heritage sites • Mountain peaks
8	• Hiking trails • Existing adventure destinations
9	• Forests • Tourist corridors
10	• Wind model • Mountain peaks
11	• Fishing hotspots • Tribal areas
12	• Private and state farms

Respondent 1 suggested that existing tourism resources be located on the hotspot map. These resources include, firstly, existing TKZN tourism assets (see Figure 3.12 below), and secondly, Ezemvelo KZN Wildlife (EKZNW) sites (shown in Figure 3.13) and nature conservation sites (see Figure 3.15). The respondent suggested that future research should involve adding weights to these existing tourism resources and using the adventure hotspot map to involve local stakeholders in planning decisions.

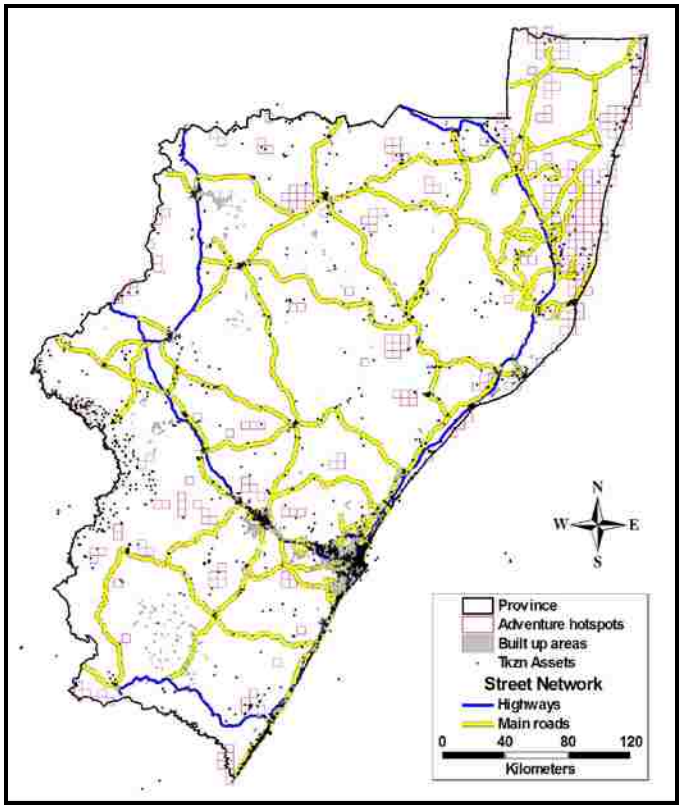


Figure 3.12: TKZN tourism features and identified adventure hotspots

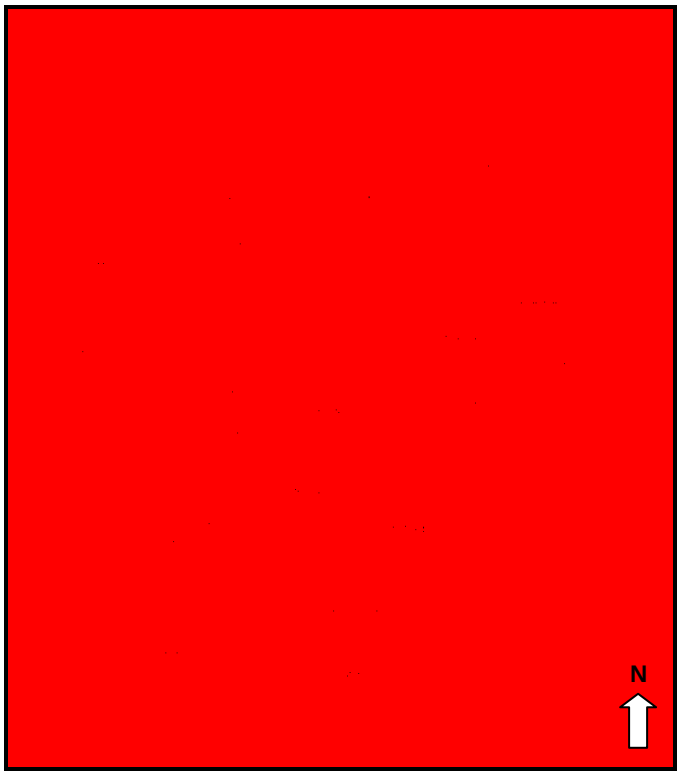


Figure 3.13: Existing EKZNW assets (Ezemvelo KZN Wildlife, 2009 b)

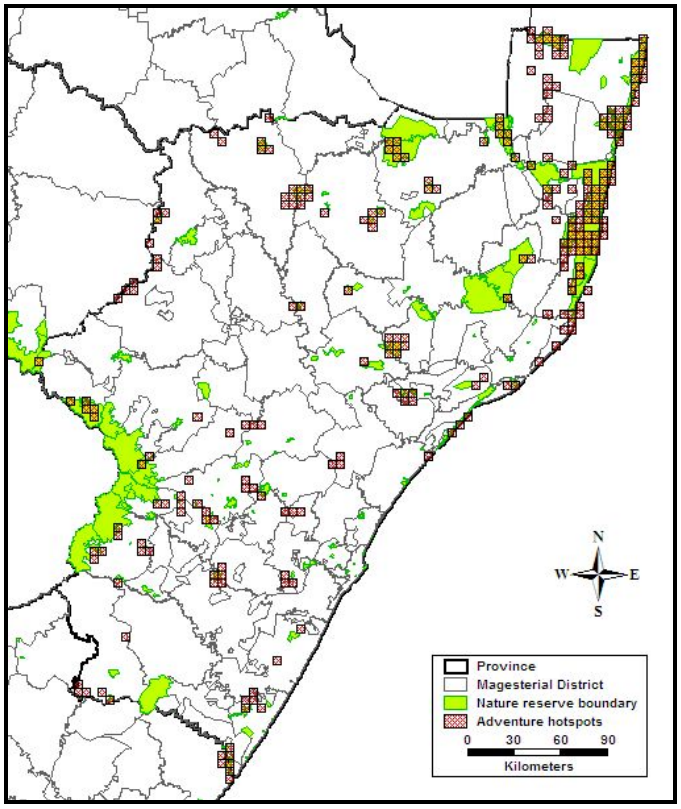


Figure 3.14: The ENPAT nature conservation layer and adventure hotpots

Respondent 2 was in agreement with the researcher in relation to foreigners and local domestic travellers from South Africa who would consider interacting with the indigenous tribes of KZN as a type of cultural adventure. The respondent highlighted that the difference in culture and traditional values will result in small to large degrees of culture shock. The respondent suggested a map to locate those hotspots falling in or next to a local traditional village (see Figure 3.15). Respondent 2 reminded the researcher that the traditional tribal chiefs may experience mixed feelings in relation to involvement in tourism development. The respondent reiterated the potential to tap into these areas as cultural adventure destinations. Respondents 1, 4 and 11 all had similar attitudes towards the indigenous tribes of KZN.

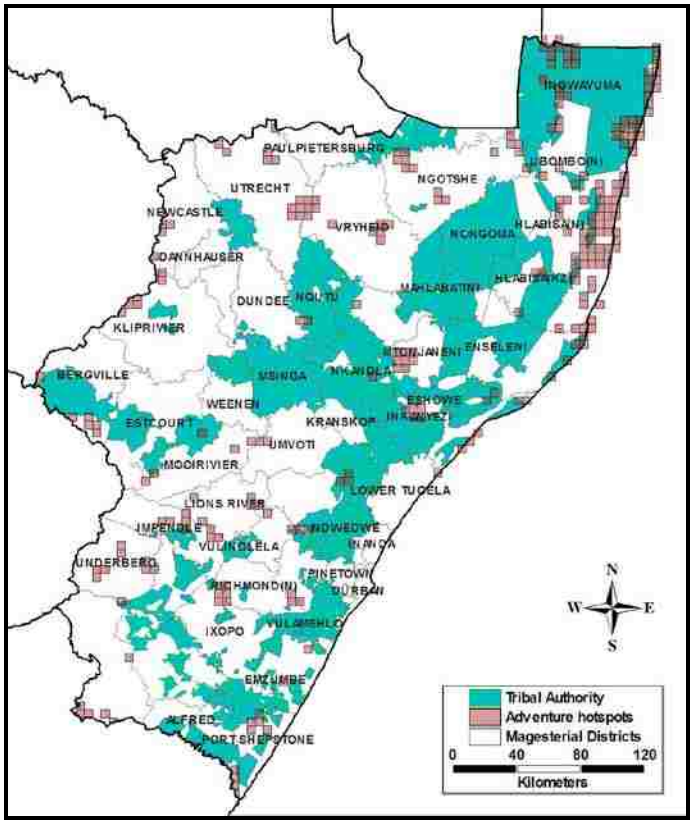


Figure 3.15: Map of traditional tribal areas in KZN and identified adventure hotspots

Respondent 2 further proposed the inclusion of an ocean layer highlighting diving hotspots. The respondent suggested that the reality of all-year warm oceans along the east coast makes KZN an ideal location for those who appreciate warm subtropical diving conditions, in stark contrast to the cooler waters on the west coast of South Africa.

Respondents 1, 3, 4, 5, 6 and 12 highlighted the importance of distinguishing between private and state farms. Many existing adventure races, such as the Sani Trans-Frontier Challenge and the junior and senior National Off-Road Motorbike Races, are held in the province. These races traverse through pristine landscapes owned by private commercial farmers, traditional chiefs or on state commercial land. The researcher contacted the provincial spatial planning department. The GIS manager informed the researcher of the extreme sensitivity regarding private and state farms, and that such data is therefore not available to the public. The lack of spatial data relating to this and other features will be further elaborated in Section 5.6.

Respondents 7 and **10** were not satisfied with the hotspots in the Drakensberg region. The respondents suggested a closer look at the existing adventure sites in and around the region. The respondents suggested treating the Drakensberg mountain peaks as one complete unit for adventure activity. Figure 3.16 graphically illustrates the 'high–mountain' layer and the adventure hotspots layer.

Respondents 3 and **10** pointed out the high peaks of the Drakensberg and the surrounding rolling hills of the Midlands as definite areas for wind sports and climbing. The respondents recommended giving adventure status to all these areas. Figure 3.16 shows the peaks of the Drakensberg as well as the peaks of the Midlands stretching towards the lower Tugela.

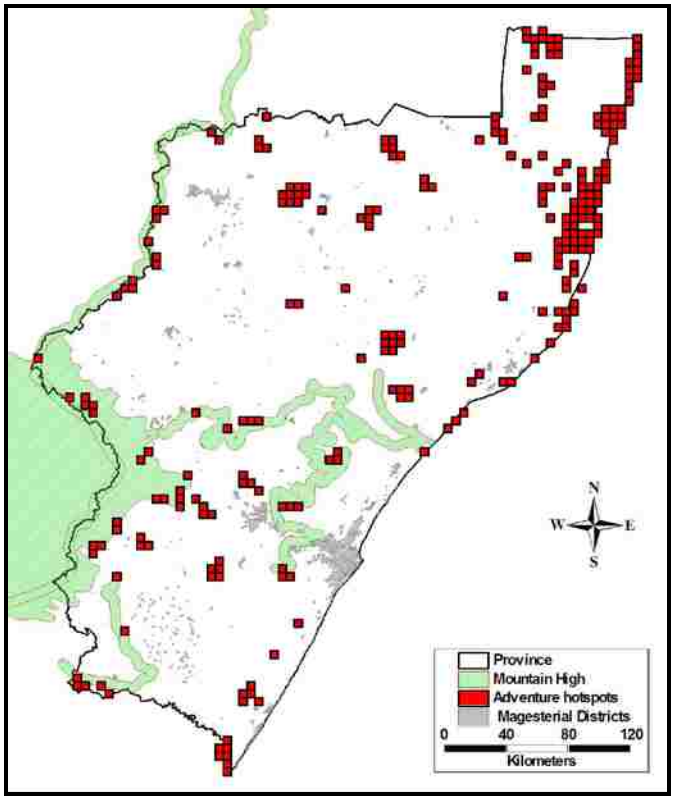


Figure 3.16: High mountain peaks and identified adventure hotspots

Respondent 11 indicated fishing spots along the coast as possible adventure destinations. The respondent suggested using the existing categories of the ENPAT data, such as sandy, rocky and pebble beaches, which already broadly relate to the main categories of ocean angling.

Respondents 2 and **8** suggested hiking trails throughout the province as important walking adventure hotspots.

Respondent 6 advised the researcher to include a ‘waterfalls’ layer. The researcher contacted EKZNW Wildlife and sourced the most current waterfalls layer. It was then included in the GIS application.

Respondent 9 stressed the importance of existing tourism corridors, which often exist because of the availability of tourist accommodation and road infrastructure (see Figure 3.17). These tourist corridors have specific ‘T-Routes’ designations given by the TKZN authority. These ‘T-Routes’ are marketed by a combination of signboards and hard copy brochures handed out at tourist information centres throughout the province; it is vital for travellers moving around the province independently and/or in a group. It is because of the planning and establishment of these ‘T-Routes’ that road infrastructure and tourist facilities have developed. Tourists can now find there way to the identified ‘adventure hotspots’.

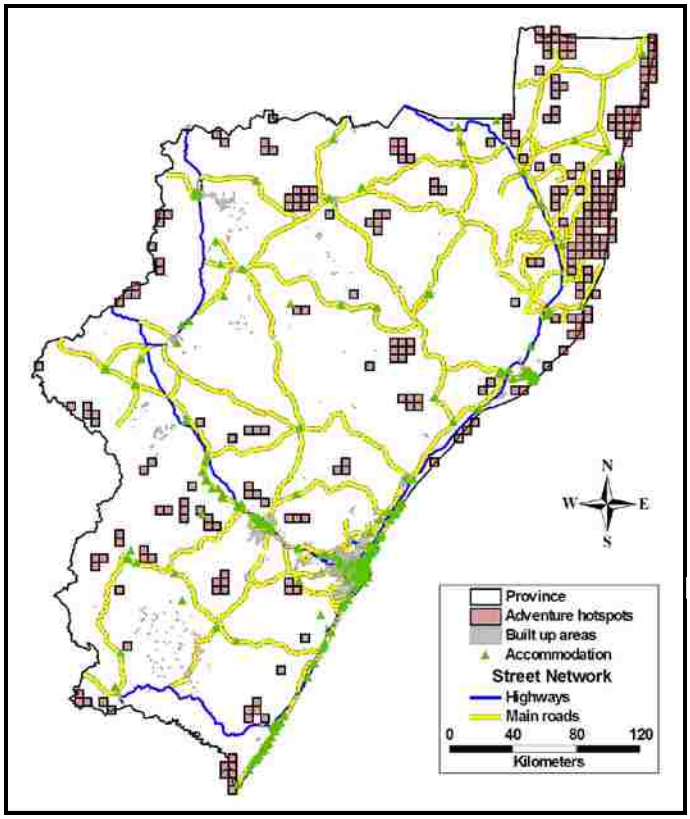


Figure 3.17: Accommodation in proximity of the identified adventure hotspots

Question 6

6. Refer to the regional map relevant to your working area (3.1 – 3.9). If you chose 1.10 as your answer to question one, please choose a regional map which you have good knowledge of.

6.1 Express your satisfaction with the spatial patterns in the map.

Strongly dissatisfied	Dissatisfied	Neutral	Satisfied	Extremely Satisfied
1	2	3	4	5

6.2 With your working experience in your local region can you identify other hotspots that have been excluded in your relevant working map? Use the Alphanumeric indexing system provided and list in the box provided below.

e.g. Aa2 , Bb4

6.3 With your working experience in the local region can you identify those hotspots that are truly new to you, i.e. you did not expect to see them as potential hotspots. List the areas by referring to the identified labels.

e.g. C1, C2

The aim of **Question 6.1** was to ascertain the respondents' perceptions of the spatial distribution of the hotspots. A five-point Likert scale was used, with 1 representing 'strongly disagree' and 5 representing 'strongly agree'. The responses are summarised in Figure 3.18.

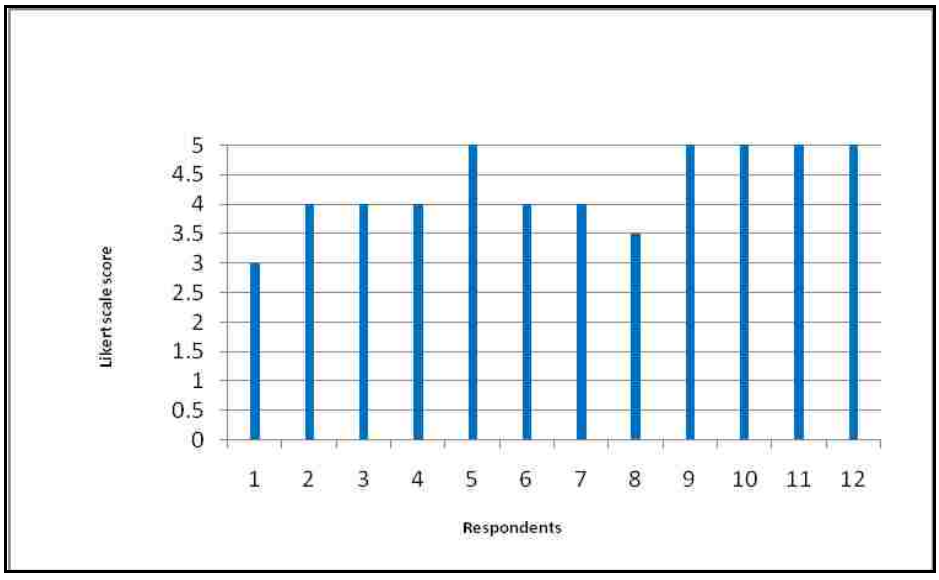


Figure 3.18: Respondents' satisfaction with spatial distribution of hotspots

The average score of 4.3 (86%) suggests that in general, the respondents were satisfied with the spatial distribution of adventure hotspots. The respondents made some interesting comments about this question, which are summarised below.

Respondents 2, 4, 7 and **8** were concerned about the Drakensberg region and suggested a closer inspection of other spatial layers that accentuate the hotspots in the region.

From the outset the researcher was concerned about the lack of hotspots along the beaches of KZN. **Respondents 12** and **11** were in agreement with the spatial distribution and noted that many of the existing beach spots were already overcrowded and not suitable for the adventurer (in accordance with the adopted research definition). Interestingly, kite surfing has recently become popular along the coastline of KZN. This niche adventure activity has the potential to rejuvenate many of the existing over-saturated beaches along the coastline.

Question 6.2 provided the researcher with an insight into the adventure destinations perceived as missing on the hotspot map. Table 3.12 summarises what the respondents perceived as missing adventure hotspots.

Table 3.12: Missing adventure hotpots

Respondent	Summary of missing adventure hotspots
1	• Farms (midlands area) hosting the Sani-Pass trans-frontier mountain bike race
2	• Mnweni valley in the Drakensberg for cultural adventure
3	• Valley of a Thousand Hills just outside Durban
4	• Central and southern Drakensberg
5	• Shembe mountain range • Ndewdwe mountain range
6	• East of Mngweni • Isandlwana
7	• Lost Valley
8	• Dukuduku forest. • Battlefields hikes
9	• Ungoya forest; Nkandla forest; Qudeni forest • Route 66 towards Pongola
10	• East of Richmond
11	• Dukuduku forest • Lebombo tourism corridor • Farms and plots hosting the junior and national cross-country motorbike race
12	• Red desert near Port Edward • Umtentweni, Umtamvuma and Umzimkulu valleys near Karkloof

Question 6.3 was included in the questionnaire to ascertain whether there were any hotspots truly new to the respondents. Table 3.13 summarises the responses. There were three respondents who noted the area around Vryheid as significant. Of lesser

significance were the hotspots near Tugela and Richmond. There were eight respondents who did not identify any truly new hotspots.

Table 3.13: Truly new hotspots

Respondent	New hotspots
1	• Area near Vryheid is a possibility
2	• Not really
3	• Not really
4	• Five hotspots west of Tugela and the nine near Vryheid
5	• Area around Vryheid
6	• Not really
7	• Not really
8	• Not really
9	• Not really
10	• West of Richmond forest
11	• Not really
12	• Not really

3.5.3 Planning for sustainable tourism at identified hotspots

In this section, the respondents' experiences and knowledge of involving locals in decision-making in areas such as the identified hotspots are analysed and interpreted.

Questions 7 and 8

7. Taking into consideration the pristine and remote nature of all these hotspots (map 1), read the following in relation to responsible planning and answer question 8.

    7.1 Ensure communities are involved in and **benefit** from tourism (at the identified hotspots – map1)
    7.2 **Market** tourism that is responsible, respecting local, natural and cultural environments (at the identified hotspots)
    7.3 **Involvement** of the local community in planning and decision making (at the identified hotspots – map1)
    7.4 Usage of local resources **sustainably** (at the identified hotspots)
    7.5 Be **sensitive** to the host culture at these destinations (at the identified hotspots)
    7.6 Maintain and encourage natural, economic, social and cultural **diversity** (at the identified hotspots)
    7.7 Undertake **assessment** of environmental, social and economic impacts as a prerequisite to developing tourism (at the identified hotspots)

8. Now that you have read the above (7), choose the 3 most important with regard to the hotspots as identified in Map 1.

	Item number (e.g. 7.1. 7.3, 7.7)
Most important	
Second most important	
Third most important	

The content of question 7 was cited from the White Paper for Tourism Development Section and the (KZN Department of Arts and Culture 2008). The ISM manager of TKZN noted many similarities between points 7.1 and 7.7. The researcher duly allowed all respondents to enter more than one option in the boxes (question 8). The most frequent responses to the question are summarised in Table 3.14.

Table 3.14: Perceptions of the importance of different approaches to planning in adventure hotspots

	Distribution of responses						
Respondent	**7.1**	**7.2**	**7.3**	**7.4**	**7.5**	**7.6**	**7.7**
1			▲	■	●		
2			▲	●			■
3	●		●	■			■
4			■		▲		●
5					■		
6	●	■	▲				
7		●	■	▲			
8	■		■		▲		●
9	■		■	●	●		▲
10	■		■		▲		●
11	■	●	●	▲	■		
12		■			●		

■	Most important
●	Second most important
▲	Third most important

Option 7.3 was most frequently chosen; 10 respondents selected this option. Eight respondents chose option 7.5, making it the second most chosen option. Six respondents chose options 7.1, 7.4 and 7.7, making it the third most selected option.

Four respondents chose 7.2, and none of the respondents chose 7.6. The feedback suggests that all respondents are aware of the complexities involving the traditional tribal chiefs in planning and decision-making. Interesting comments made by the respondents are summarised below.

Respondent 1 mentioned that planning is often constrained by external variables unique to a region. The respondent highlighted dagga (marijuana) trafficking between Lesotho and KZN. Local tribesmen are very familiar with the high peaks of the Drakensberg and spot authorities from far distances, only to change the route and elude the authorities, avoiding being caught. The respondent suggested that drug traffickers are becoming braver. They resort to pick-pocketing and armed robberies of hikers in the upper peaks of the Drakensberg mountain range. Respondent 1 predicts that, in the future, tourism authorities will consider all mentioned categories stated in question 7 (above), together with niche technological 'state of the art' flying probes. These probes can possibly monitor and send information to authorities relating to the movement of drug traffickers between Lesotho and KZN.

Respondent 2 suggested that the points mentioned in question 7 were, to a certain degree, extremely generic. Each village had a unique set of factors affecting the development of the region. The example of the Mnweni valley is a vivid reminder of the sensitive nature of the local rural people from the Drakensberg region. The traditional ways of life of the Mnweni tribe are extremely vulnerable to encroaching development. Expansive transport networks were built because of the need to develop in and around the Mnweni valley. The local Mnweni population is growing steadily, which causes a strain on living space. Villagers are moving to higher peaks to graze their cattle, causing degradation of the fragile peaks of the Drakensberg mountain range. Some of the Mnweni villagers also resorted to selling roadside curios to passer-by tourists, opting to quit their traditional ways of life. The respondent highlighted the extreme sensitivity or fine balance between the need to develop and the need to preserve the indigenous traditions of the locals. These sensitive factors, such as locals quitting their traditional ways of life and encroaching infrastructure in traditional regions of the Drakensberg, are causes for concern for tourism authorities.

Respondent 8 mentioned that some of the hotspots would fall in remote areas far from human civilisation. Not all the hotspots would have communities living there.

Respondent 12 highlighted the importance of NEMA and the Spatial Development Act. These acts have major implications for planning and development of tourism regions.

Questions 9.1 and 9.2

9

9.1 Referring to your working regional map, have you initiated contact and engaged the locals in decision making at any of these identified hotspots. Please insert a tick into the relevant box

Yes	
No	

9.2 If your answer in the previous section is YES, please enter the area into box provided below.

These questions sought to ascertain whether the respondents worked with the local populations in or near to the identified hotspots. The feedback of the respondents is given in Table 3.15. Seven respondents were active among the locals and five respondents were not active. All the respondents who ticked 'yes' highlighted the differences between the tourism and tribal authorities. These differences predominantly relate to modern urbanised thinkers and the traditional rural ways of life of the indigenous tribes of KZN. Comments from the respondents suggested that successful participation of locals can only be achieved by an individual who has many years of experience and a deep insight into the local customs, traditions and language.

Interesting comments noted by the respondents are summarised on the following page:

Respondent 9 explained the process of involving the local tribes. Firstly, the local council sets up a meeting with the tribal chief. The tribal chief will then liaise with his Indunas (village elders) and confirm a time and place. This would often take many months, since the tribal chief and the elders are not as hard pressed for time as the development planners from TKZN.

Respondent 10 suggested that the tourism authorities needed a deep insight into the local traditions and customs of the local tribe.

Respondent 12 stated that it is important to first speak to the tribal chief of the local community before any money is spent on the development.

Table 3.15: Engagement of locals at hotspots

Respondent	No	Yes
1	•	
2		The Drakensberg region
3	•	
4	•	
5	•	
6	•	
7		The Drakensberg region
8		Dukuduku forest and Mbongweni
9		Nkandla and Tugela
10		Midlands
11		Dukuduku
12		Uzumabantu Council and Utumbulu
Total	5	7

Questions 10 and 11

10. What is the best medium of communication to initiate local involvement in the identified hotspots?

10.1. Participate in a workshop with local amaKhosi / Local representative and other community elders from surrounding areas.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

10.2Telephone interviews and surveys with amaKhosi / Local representative.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

10.3. Email correspondence with amaKhosi / Local representative.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

10.4. One on one interview with amaKhosi / Local rep.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

Other, Please specify,

11. From the previous question, which in your opinion will work the best? Enter just ONE option into the box provided below

These questions (10 and 11) sought to determine the best method of communication to initiate and maintain a healthy relationship with the locals**.** Table 3.16 below summarises the frequency of responses to Question 11.

Table 3.16: Perceptions of best methods to communicate with locals at hotspots

Respondent	Option			
	10.1	10.2	10.3	10.4
1	•			
2				•
3	•			
4				•
5				•
6				•
7				•
8				•
9				•
10	•			
11	•			
12	•			
	5	**0**	**0**	**7**

Option 10.4 was most frequently chosen by respondents, with 10.1 the second most frequent. The respondents unanimously highlighted the tedious nature of maintaining a sustainable relationship with the locals. Often there would be many one-on-one interviews before any progress was made. Another important comment was that not all the hotspots fell into a tribal area. Figure 3.14 shows the hotspots that fall into a tribal area.

Respondent 11 highlighted the contrasting feelings often transpiring between tribal chiefs. The respondent spoke of the Dukuduku forest community and their neighbours to the north. The one tribe is supportive of tourism development, in stark contrast to the community further north, which are more traditional and do not want any form of tourism development.

Respondent 12 used the example of the Sani trans-frontier mountain bike race to highlight the contrasting feelings between tribal chiefs. The respondent highlighted that it takes months, and sometimes years, to gain the trust of the local tribal chiefs.

The predominant commonality from the responses to this question is the contrasting feelings of the local tribal chiefs with regard to tourism development. This is not altogether a negative factor. Authorities have the responsibility to learn from tribal chiefs who maintain their traditional way of life and to find a plan of action that would enable both the tribal chief and the tourism authority to work harmoniously.

Question 12

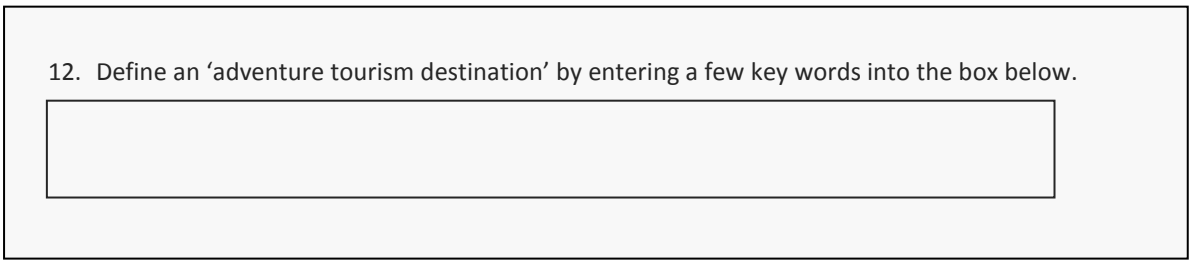


Table 3.17 summarises each respondent's keywords. The literature review (see Section 2.2.3) identified the vagueness in defining adventure tourism and the importance of understanding the context in which the adventure unfolds. The researcher was interested in what the respondents would say when asked about 'adventure' in KZN. This also provided an opportunity to create a new definition of adventure tourism in the KZN province. This will be elaborated on in Section 5.3.

Table 3.17: Adventure keywords according to the respondents

Respondent	Adventure keywords
1	• Adventure is defined by its facilities and resources
2	• Untouched • Wild • Uncertainty • Risk • Adrenalin • New experience
3	• Danger • Spectacular • Remote
4	• Adventure does not mean the same to everyone • Contact with nature • Activity must be more physically challenging than mentally • In contact with nature
5	• Adrenalin • New experience • Fun • Exciting
6	• Remote • Inaccessible • Exciting
7	• Remote • Contact with nature
8	• Adventure is defined by the available resource • Mountain adventure • River adventure • Bush experience
9	• Adventure does not mean the same to everyone • Adrenalin • Out of the ordinary • An activity
10	• Wow
11	• Natural surrounding • Outdoor • Activities • Eco
12	• Action

Table 3.18 lists the most important keywords chosen from Table 3.17. Specific keywords such as ‘adrenalin’, ‘remote’, ‘nature’ and ‘exciting’ were given prominence by the respondents. It is clear from the similar counts of these ’keywords’ that there is little consensus as to what an adventure tourism destination is.

Table 3.18: Important adventure keywords

Adventure Keyword	Times mentioned
Adrenalin	3
Remote	3
Nature	3
Exciting	2

Question 13

13. Continually reminding the adventure traveller on responsible behaviour is important to the sustainability of the destination. Certain measures, tools and media can be put in place to ensure this, can you name at least four that in your opinion could work in the identified hotspots.

1 _____
2_____
3_____
4_____

The researcher was curious as to how many respondents would identify a mobile GIS as a tool. Interestingly, only respondent 4 identified a mobile GIS as a means to send messages to the traveller. Table 3.19 lists the respondents’ feedback. Interesting comments recorded by the respondents are noted thereafter.

Table 3.19: Measures, tools and media important to the adventurer

Respondent	Measures, tools and media
1	• Media such as TV is important • Signage along the road to the destination • A registration pack with pamphlets when signing at the destination information centre or entrance gate
2	• Insight from the authorities as to where the best location for signage could be • Hiking paths should have clear and legible signs and maintained regularly by the authority • Clear but unobtrusive signs • An insight into the psychology of the ttraveller
3	• Brochures before and during the trip • Educating the tour guide on the destination’s fragile and unique resources • Ensuring the tour guide has the correct credentials
	Continued on next page

Respondent	Measures, tools and media
4	• Sign-posting at visible locations along the route • Messages to phone depending on signal and users' preferences • Because there is little infrastructure at the hotspots, brochures should be handed out at access points before the adventure
5	• Awareness using local TV and radio • Educating local communities • Ensuring the tour guides have the correct credentials and are aware of the destination's unique and fragile resources
6	• More insight into where to locate sign boards • Identity forms should be signed at the access points to the activity
7	• Signage along the route to the activity • Educating the tour guide at the destination
8	• Guide books • Educational DVDs • Using e-mail and social networks • Those adventurers who are more interested in cultural adventure should have a pre-trip workshop with the tour guide whereby the tour guide explains exactly what to do and what not to do when interacting with the locals
9	• Awareness campaigns directed at the locals • Media should play a more intense role, especially TV and radio campaigns • Involvement of local taxi drivers as tourism ambassadors. These taxi drivers have the potential to educate other locals on the benefits that tourism brings to the local economy
10	• Signage in conservation areas • Brochures handed out at strategic points along the route to the adventure activity
11	• Educating the locals and tour guides • Signage along the route to the adventure activity
12	• Interpretive centre with properly trained staff • Signage along the adventure activity to identify unique and fragile resources • Knowing the traveller's mind-set is important to grasping what should be on the signs

Table 3.20 lists the most common 'measures, tools and media' chosen by the respondents. It is clear that signage is of most importance followed by TV & Radio and education programmes for the locals and tour guides.

Table 3.20: Important 'measures, tools and media' for the adventurer

Signage	9
TV & radio	3
Educating locals, tour guides	4

Respondents 2 and **12** insightfully pointed out the psychological characteristics of the traveller as the key ingredients to fully understanding what, where and how the information should be conveyed. Section 5.7 elaborates on future research, which should involve surveying the adventure traveller in the KZN province.

Respondent 6 noted that the existing sign-posts targeting travellers are either not in the correct location or lack the ability to grab travellers' attention. The respondent highlighted a need to improve the signage across the province with more input from the provincial GIS department about the best location for the signage boards. This question's feedback also assisted in formulating the content for the second objective of this research.

Question 14

14. A Mobile Geographic Information system (GIS) on a hand-held device has been identified as a medium to unobtrusively remind the adventurer of the unique and fragile resources that are present in these hotspots thus allowing the user to partake wholeheartedly in the unfolding adventure whilst still being a responsible traveller.

14.1 Do you agree with the above statement?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

14.2 Who, in your opinions should manage the development of such an application?

14.2.1 Government

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

14.2.2 Industry

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

14.2.3 Industry + Government

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

This question was included to determine (on a Likert scale of 1 to 5) if the respondent considered a mobile GIS as a tool to enhance the adventurer's behaviour and consequently improve the sustainability of the adventure hotspot. The respondents reported a sense of belief in technological tools such as a mobile GIS.

Seven of the respondents strongly agreed (5 on the Likert scale) while 5 agreed (4 on the Likert scale) that a mobile GIS would work for the adventurer. Interesting comments by the respondents are noted next.

Respondent 1 stated that the adventurer could either be the young backpacker type adventurer who may have the desire to take a phone along, or it could be an older adventurer, who in contrast, has the desire to escape from technology devices related to his normal work life.

Respondent 2 stressed that the application should be as 'unobtrusive' as possible. The respondent suggested that the device should stop inundating the adventurer with information when at the actual destination. The respondent stated that it would be a total disaster if the mobile device starts beeping while hanging off a sheer rock cliff on top of the mountains.

Respondent 5 argued the issue of network coverage in KZN. Certain hotspots may be in low coverage areas and the necessary information would not be able to be delivered to the adventurer in time to be used.

The aim of question 14.2 was to ascertain the respondents' perceptions in relation to the development of a mobile GIS application. Table 3.21 summarises the respondents' feedback.

Table 3.21: Question 14.2 – development of a mobile GIS application

Respondent	Government	Industry	Industry & Govt
1	Not really	Not really	Definitely yes
2	Definitely not	Yes, I think so	Not really
3	Definitely not	Not really	Definitely yes
4	Yes, I think so	Not really	
5	Not really	Not really	
6	Definitely not	Yes, I think so	
7	Not really	Not really	
8	Definitely not	Definitely not	
9	Not really	Definitely yes	
10	Definitely not	Definitely yes	
11	Not really	Not really	
12	Not really	Not really	

Table 3.22 summarises the findings from Table 3.21. From the findings it is apparent that the majority of the respondents (5 – definitely not and 6 – not really) are not in favour of government being involved with the development of a mobile application. It is also apparent that the respondents are not really (6 respondents) keen for industry

to develop such an application on their own. There were two respondents who were in favour of industry developing the application on their own and similarly two who suggested that the application be developed as a collaborative effort between industry and government. Feedback to be noted is provided below in Table 3.22.

Table 3.22: Summary of who should be responsible for the development of the mobile GIS application

	Definitely not	**Not really**	**Yes, I think so**	**Definitely yes**
Government	5	6	1	0
Industry	0	7	2	2
Industry and government	0	1	0	2

Respondent 1 suggested that the development of a mobile GIS must be an initiative managed by one effort of the country's cellular companies: Cell C, Vodacom, MTN, Telkom. The data servers should ideally be hosted in TKZN. The respondent insightfully suggested that the mobile GIS can also be used to monitor the movements of travellers, which can lead to useful statistics for the TKZN tourism practitioners.

Respondent 5 noted that having access to accurate data sets is a priority. The respondent pointed out that a lack of information sharing exists between the National Tourism Department, provincial tourism, South African Grading Council and the Culture Arts, Tourism, Hospitality and Sport Sector Education and Training Authority (Cathsseta).

Respondent 7 reminded the researcher that many 21st century travellers have a GPS on their phones, and that there is potential to develop such an application. The success of such an application will depend on tourism researchers working with government and industry to ensure that it is developed with the adventurer in mind.

Respondent 10 suggested that the development of such an application must undoubtedly be run and managed by industry. Government should put out a tender to private companies, and the correct protocol should be adhered to.

3.6 Conclusion

Identifying adventure hotspots was possible by using the functionalities of a GIS. This chapter provided an overview of the applied GIS method, followed by the details of the results of the GIS analysis. Validating the GIS findings was an integral part of this research. This validation was done by means of a questionnaire survey conducted among KZN tourism practitioners. The results suggest that the KZN practitioners were generally pleased with the methodology and the output maps created. The questionnaire also added valuable information with regard to managing and developing a hotspot and measures to improve the responsible behaviour of the adventurer when at an adventure hotspot.

With advancements in mobile technology, it is now possible to send useful information prompts to the adventurers' mobile device that could enhance his/her responsible behaviour in the environment. In Chapter 4, the establishment of useful information prompts and the conceptual framework for the adventurer in KZN is discussed in detail.

Chapter 4: Adventure traveller information prompts for a mobile GIS framework in the KZN province: methodology and results

4.1 Introduction

The first component of Objective 2 is to establish responsible information prompts relevant to adventure travel. In order to achieve this component, attention was given to three aspects. In Section 4.2.1, the knowledge pool relevant to the information prompt is examined. The strategy adopted to structure the knowledge pool is described in Section 4.2.2. Details of the categorised information prompts are subsequently reviewed in Section 4.3.1 – 4.3.4. The second component of Objective 2 is to conceptualise and then to illustrate how the information prompts about adventure travel hotspots and desired responsible behaviour can be adapted for eventual implementation in a mobile GIS environment. To achieve this component, attention was given to three aspects. Section 4.4 will describe the methodology adopted for the mobile GIS framework. Firstly, the knowledge pool in relation to mobile GIS applications relevant to tourism will be discussed (Section 4.4.1). This will be followed by a proposed structuring of the knowledge pool (Section 4.4.2). This is achieved by reviewing the unique characteristics of the adventure traveller and the theoretical guidelines applicable to the design of a mobile GIS (for the adventurer). In Section 4.5 (4.5.1 – 4.5.7), the outcome of the adopted methodology (a set of seven criteria each merging adventurers' characteristics, theoretical guidelines and most appropriate existing mobile applications and other applicable WWW sources) is discussed.

4.2 Methodology - establish responsible adventure tourism information prompts (component one of Objective two)

4.2.1 Data gathering - exploring the knowledge pool

The findings of Boniface (2001) and Jamieson (2006) were used to guide the exploration of the knowledge pool relevant to adventure tourism in KZN. Boniface (2001) proposes that the dynamic post-modern traveller is in dire need of fresh

knowledge. Establishing useful information relating to adventure tourism was also steered by Jamieson (2006), who suggested that the major challenge is to deliver information in a useful and insightful way and not just to deliver information.

In order to establish a list of information prompts relevant to adventure travelling, the researcher used information from the following sources:

1. Internet portals that focus on the traditional cultural storyline of places and people in KZN;
2. the United Nations World Tourism Organisation (UNWTO) and the South African Department of Environmental Affairs and Tourism (now known as the National Department of Tourism);
3. regulations from a country such as Canada, that has a long history of providing adventure tourism products;
4. associations and companies that have a presence on the WWW and are involved specifically in adventure tourism research and services provision; and
5. TKZN hard copy brochures and booklets.

These five sources will now be discussed in more detail.

1. Internet portals that focus on the traditional cultural storyline of places and people in KZN.

   Relevant Internet sites have given substance to the interpretive storyline approach suggested by Jamieson (2006) and Schliesser et al. (2007) in the KZN context. The first site (UKZN Literary tourism 2009) is a collaborative effort between TKZN and UKZN. It is an Internet site rich in online literature dedicated to places, events and fictional texts, as well as the lives of their authors. The site embraces the new field of ‘literacy tourism’. The primary focus of the content is to describe how writing was influenced by place and how writing creates place.

   The second site (KZN North Happenings, 2009) recounts the history of the Zulu nation in South Africa, early Natal history, the history of the Nguni people, the British settlement in Natal and the general history of the province. The third site (Can Teach

2009, a, b) worth mentioning is rich in Zulu folk tales, songs, games and poems. The fourth site (Library Think-quest, 2009) of relevance was created and is maintained by students at St Mary's School in Johannesburg. It hosts information related to traditional Zulu culture, such as maps, and information on lifestyle, dressing styles, homestead rituals and customs, diet, folklore, traditional healing, language, warfare, history and the modern Zulu.

2. The UNWTO and the South African Department of Environmental Affairs (now known as NDT).

   The UNWTO compiled a Global Code of Ethics for tourism (Global Code of Ethics, 2008). This list informs the visitor about the cultures and traditions found at the heart of the destination, the fragile state of the natural environment and the sensitive human-host relationship. The opening paragraph succinctly sums up responsible travel: *"Travel and tourism should be planned and practiced as a means of individual and collective fulfilment, when practiced with an open mind; it is an irreplaceable factor of self education, mutual tolerance and for learning about the legitimate differences between peoples and cultures and their diversity*" (Global Code of Ethics, 2008:1).

   On a national scale, the former South African Department of Environmental Affairs and Tourism (DEAT) published the national tourist guidelines (DEAT, 2002). This document focused on responsible tourism practices for the tourist, the supplier and the authorities in South Africa.

3. Regulations from a country, such as Canada, that has a long history of providing adventure tourism products.

   Canada, renowned for its pristine environments, is one of those countries that have been involved with adventure tourism for many decades. The Canadian efforts to put in place measures to ensure that their tourism resources are managed in a sustainable manner are significant. The Tourism Industry Association of Canada, in cooperation with the National Round Table on Environment and Economy, devised a

‘code of ethics’ for the tourist. The three broad categories in the code of ethics are conservation of natural resources, protection of the environment and the preservation of the cultural heritage of destination. Although this code of ethics is not specifically for the adventurer, it still has value since it is designed for all tourist types (Tourism Industry Association of Canada, 2009).

4. Associations and companies that have a presence on the World Wide Web and are involved specifically in adventure tourism research and services provision.

   There are many World-Wide-Web sites that host relevant information significant to adventure tourism. One of these is the Adventure Travel and Trade Association (ATTA) (Adventure Travel and Trade Association, 2011). The primary aim of this association is to link as many adventure suppliers from as many countries as possible on a common platform. This affords the opportunity to do extensive travel research about a particular destination. Furthermore, a vast knowledge base of travel research and documentation pertaining to responsible tourism is also available. The second site that is relevant to the context of this research is that of the international travel company, Intrepid Travel (Intrepid travel, 2011). They have well-documented publications on case studies, research reports and travel guidelines. Intrepid Travel is an established worldwide adventure travel supplier that is active in many countries across the globe. Apart from their tours on offer, Intrepid Travel has an online repository of relevant publications on travel tips and guidelines, serving the novice as well as more advanced adventurers.

5. TKZN hard copy brochures and booklets.

   The remaining part of this sub-section reviews the conventional information that the adventurer would have available through the TKZN web portal (TKZN, 2011), as well as in hard copy, from TKZN information kiosks, which are available throughout the province. TKZN produced a variety of media that are available to the adventurer. Of importance is the one-page brochure, ‘Safety Tips for Tourists’ (TKZN, 2009a); a joint initiative with the South African Police Services. It is a glossy fold-up document with

useful and valuable resources for the tourist. The content of the brochure is split into the following categories:

- on the street;
- in the car;
- on the beach;
- visiting sites in rural areas;
- accommodation, and
- at the airport.

The brochure further lists all useful emergency numbers for tourists in KZN, with a value-added call centre number linked directly to staff that are knowledgeable about specific tourist regions. The brochure has attractive graphics and it directs the reader's attention to sustainable practices in the natural and cultural environment in KZN.

The second relevant TKZN media source is 'Travellers Tips' (TKZN, 2009b) a nine-page mini-booklet designed in collaboration with the South African Police Services and the KZN Department of Community Safety and Liaison. The booklet keeps the same sub-headings as the one-page brochure, but offers more in-depth explanations. It contains additional information as an overview of what to expect from KZN as a tourist destination. The back cover of the mini-booklet lists basic isiZulu phrases with its English meanings. This is useful to the tourist who cannot speak isiZulu. The TKZN 2008/2009 'Tourist Map', published in collaboration with Braby's (2010), has useful additional information inserted along the map boundary and in open spaces. Some of the more relevant information along the boundaries include: facts and figures relating to the population statistics, predominant languages in the province and telecommunication standards

Perhaps the most relevant to the adventurer is the 2006/2007 'Kingdom of Adventure' guidebook (Kohler & Ragavan, 2006:1-36). The 36-page guidebook contains numerous regional maps and detailed directions to all the adventure activities in the

TKZN tourist regions. The adventure activities are split into air, land and water adventures. Useful telephone contact numbers are listed on the inside back cover. A point of interest is the content categories chosen by TKZN. These categories cover all the relevant adventure activities available in KZN (see Appendix 7). Another source worth mentioning is the brochures from EKZNW. These brochures have useful tips and information related to sustainable practices while hiking and camping in the conservation areas of EKZNW (KZN Ezemvelo 2009a).

4.2.2 Structuring the knowledge pool

Making the adventure traveller aware of the sensitivity of the natural environment should start during the planning phase. It should then be done again when the adventurer actually arrives in the location and participates in an activity (Wilks & Page, 2003). This awareness of the natural environment is further elaborated by Moscardo (1999), who suggests that visitors should be made aware of the biosphere and ecosphere so that they can treat it in a sustainable manner.

A description of the methodology adopted to structure the information now follows. The information prompts in its entirety is a sequence of categorised tables. A real-life mobile GIS application can make the content of the tables available to the adventurer at relevant times during his/her actual adventure. This can be achieved by linking the items of the tables with geo-referenced spatial features in the GIS. As mentioned earlier, Jamieson (2006) and Boniface (2001) inspired the concept of the information prompts. They both suggest that there is a plethora of information available to the traveller and that tourism researchers have the responsibility to find ways to deliver the proper information at the right time of the journey.

Jamieson (2006) suggests guidelines on how to go about devising information that can be shared with and interpreted by the traveller. These guidelines which have been put forward as questions have guided the research in how to structure the information categories. The categories focus on the resources and themes being interpreted, the aim of the information, the target population, the budget for devising information,

people, resources and time required to devise the information and the evaluation of the outputs. These guidelines are discussed in detail below.

- What are the resources, theme and sub-theme to be interpreted?

The resources under the spotlight in this research are spatial features relating to adventure activities in KZN, and the adventure categories as defined by TKZN. These spatial features are related to the data sources used in this research (as shown in Table 1.7). The theme being interpreted is adventure tourism in KZN. From the sources mentioned in the previous section, the sub-themes were extracted and presented as categories (see Table 4.1).

Table 4.1: Information prompt categories

Categories	**Description of categories**
Category 1	Contact numbers or contact websites, WWW-information on associations and other useful information
Category 2	Safety of the adventurer
Category 3	Responsible treatment of the traditional cultural environment
Category 4	Responsible treatment of the pristine natural environment

- Why are these resources and themes (the terminology used by Jamieson, 2006) being presented to the tourist and what should the presentation accomplish?

These resources and themes are seen as important to the adventure traveller because they have the potential to educate the traveller and make him/her knowledgeable about the environment in which he/she is travelling. The main themes relate to the three main adventure categories according to the TKZN guidelines, which are air, land and water (see Appendix 7). Informing the adventurer about useful information relating to the feature broadens his/her awareness, and his/her behaviour can potentially adjust in a way that positively affects the sustainability of the destination.

- Who are the visitors to the community? What are the visitors' main characteristics?

The visitor to the community is an adventurer who can be described as an individual who is keen to experience a challenging and unique experience in a natural setting,

away from built-up areas. This type of traveller would normally want to engage in an adventure-related activity at the destination.

- How, when and where should the interpretive information services be presented to the traveller?

The presentation is in the form of information prompts stored in a sequence of categorised tables. These information prompts can be delivered to the adventurer by means of a mobile device while he/she is travelling through KZN. In Section 4.5, the conceptual framework for a mobile GIS is discussed in more detail.

- What will it cost, in terms of people, time, resources and budget, to implement the plan?

This research goes as far as establishing a sequence of categorised tables that could potentially be implemented on a mobile GIS platform. The cost of implementation and technical aspects goes beyond the scope of this research.

- How will the parts of the list of information prompts be evaluated to see if all the objectives are achieved?

Future research endeavours could potentially lead to the development and implementation of a mobile GIS application that uses the information prompts. It will be recommended (see Section 5.4) to undertake a survey after the adventurer's trip to ascertain whether the approach was of any use.

It should be noted that only Jamieson's (2006) first guideline steered the creation of the information prompts. The other guidelines discussed by Jamieson (2006) only add substance to the assessment of how the categories are created and how it could work in a real-life application. The details of the categorised information prompts described in the first guideline are discussed in the following section.

4.3 Results - catalogue of information prompts for the adventurer

The information prompts in their entirety are a sequence of categorised tables related to spatial features in the GIS. Although the prompts are just examples, they were collated with the possibility that they could be implemented on a mobile GIS platform. These categorised tables each have a column containing an identifier field that relates to a spatial layer (referred to as the 'related spatial feature' column in the categorised tables) (as described later in this section) in the mobile GIS database.

The steering guidelines from Jamieson (2006) are the resources, theme and sub-themes to consider in the research (refer to guidelines in Section 4.2.2). The resources relate to the spatial features (see Table 1.7) used in the GIS application. The theme refers to the adventure tourism, while the sub-themes refer to the information prompt categories (see Table 4.1).

Each of the four information prompt categories is critically important to the adventurer at different stages of his/her trip. To understand the importance thereof, it is necessary to analyse and discuss how each of these categories functions in a mobile GIS environment. This will be elaborated on in the remaining part of this section, as well as in Section 5.4.

4.3.1 Category 1: Contact numbers or contact websites, WWW-information on associations and other useful information

The category 1 information prompts are deemed to be important during the planning stage. It can also be useful to adventurers during their actual trip. Suppose that a tour provider does not provide the service in accordance with the agreement. Direct contact with the controlling association can have a positive impact, since the traveller can report his/her dissatisfaction to the controlling association. Tables 4.2(a) to 4.2(d) list the information prompts for activities related to category 1. Information could not be found about all the adventure activities. In these instances, the code 'N.A.' (not available) was inserted in the relevant cell.

Table 4.2(a): Category 1 information prompts — vehicle adventures.

Vehicle adventures	Contact numbers or contact website	WWW-information on associations and other useful information
4 × 4 drives	MotorSport South Africa (MSA) national number 0861672672	http://motorsport.co.za/
Motorbiking	MSA national number 0861672673	http://motorsport.co.za/
Quad biking	MSA national number 0861672674	http://motorsport.co.za/
Cycling	http://www.cyclingkzn.co.za/contact.php steve@aceman.co.za	http://www.cyclingkzn.co.za/
Mountain cycling	Martin Fourie, telephone: +27(0)83 300 0527	http://www.cyclingkzn.co.za/information_mtb.php
Road racing cycling	Stephen Marnewick, telephone: +27 (0)82 820 2342	http://www.cyclingkzn.co.za/

Table 4.2(b): Category 1 information prompts — air adventures

Air adventures	Contact numbers or contact website	WWW-information on associations and other useful information
Ballooning activities	(http://www.wadirum.net/sahpa/members/foreign.pdf) If you are a foreigner, the document available on the website should be completed. SAHPA, telephone: +27(0)126681219	South African Hand and Paragliding Association http://www.sahpa.co.za/)
Gyrocopter activities	Aero Club of South Africa	South African Power Flying Association (http://www.sapfa.org.za/) _ & Aero club of South Africa, (http://www.aeroclub.org.za/) _
Hang gliding activities	Telephone: +27(0)861 018018	South African Hand and Paragliding Association, http://www.sahpa.co.za/)
Helicopter activities	Aero Club of South Africa Telephone: +27(0)861 018018	South African Power Flying Association, (http://www.sapfa.org.za/) _ & (http://www.aeroclub.org.za/) Aero club of South Africa
Light aircraft activity	Aero Club of South Africa Telephone: +27(0)861 018018	
Micro-light aircraft activity	Aero Club of South Africa Telephone: +27(0)861 018018	
Parachuting activities	(http://www.wadirum.net/sahpa/members/foreign.pdf) If you are a foreigner, this form must be completed. Sahpa, telephone: +27 (0)126681219	South African Hand and Paragliding Association, (http://www.sahpa.co.za/)

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Air adventures	Contact numbers or contact website	WWW-information on associations and other useful information
Paragliding activities	(http://www.wadirum.net/sahpa/members/foreign.pdf) If you are a foreigner, this form must be completed. Sahpa, telephone: +27(0)126681219	South African Hand and Paragliding Association, (http://www.sahpa.co.za/)
Paramount activities	(http://www.wadirum.net/sahpa/members/foreign.pdf) If you are a foreigner, this form must be completed. Sahpa, telephone: +27(0)126681219	

Table 4.2(c): Category 1 information prompts — water-related adventures

Water adventures	Contact numbers or contact website	WWW-information on associations and other useful information
Scuba diving	http://www.scottburgh.co.za/scuba2.htm	(http://www.nauisa.org/home.html) South African Handbook for Divers (Venter, AJL)
Snorkelling	http://www.easysnorkeling.co.za/	(http://www.nauisa.org/home.html) South African Handbook for Divers (Venter, AJL)
Kayaking, canoeing	http://www.canoesa.co.za/AspxPages/NoticeBoard.aspx	http://canoesa.org.za/
Kayaking sea, river	N.A.	http://www.tasks.co.za/default.asp
Kite boarding	info@kitesurfers.co.za Telephone: +27 (0) 32 946 0018	http://www.kitesurfers.co.za/boards.html
Motor boarding	N.A.	N.A.
Rowing		
Sailing and yachting	Donald Whittaker, telephone: +27 (0)31 301 3078. Physical address: Point Yacht Club 3 Maritime way, Durban	http://www.sailing.org.za/
Surfing	http://www.surfingsouthafrica.co.za/	N.A.
Water skiing	N.A.	
White water river rafting	http://www.adventurezone.co.za/activities/Province/KwaZuluNatal/4/Paddling&WhiteWater/3/	
White water tubing	http://www.adventurezone.co.za/activities/Province/KwaZuluNatal/4/Paddling&WhiteWater/3/	
Windsurfing	http://www.windsurfingafrica.org/	

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Water adventures	Contact numbers or contact website	WWW-information on associations and other useful information
Yachting	http://www.rnyc.org.za/index.php telephone: (031) 3014787 / Tel: 031-3015425	N.A.
Fly-fishing	N.A.	
Ocean angling	http://www.scottburgh.co.za/fish2.htm & http://www.sealine.co.za/ SEALINE - South African Angling and Boating Community & SA Bass Angling Association, http://www.sabaa.co.za/	

Table 4.2(d): Category 1 information prompts — land-related adventures

Land adventures	Contact numbers or contact website	WWW-information on associations and other useful information
Adventure racing	George Forder +27 (0)827747530	http://sites.google.com/site/arkzn1/ & http://www.adventureracing.co.za/
Abseiling	http://kzn.mcsa.org.za/	
Bouldering	http://www.climb.co.za/	http://www.climb.co.za/
Bungee jumping	N.A.	N.A.
Canyonning		
Caving (splelunking) & Rock art	Protecting rock art - KZN, contact Amafa, telephone: +27 (0)333946543. uKhahlamba Drakensberg Park World Heritage Site UDPWHS Telephone: +27 (0)332391508	
Climbing traditional	http://kzn.mcsa.org.za/	http://kzn.mcsa.org.za/
Climbing sport	http://kzn.mcsa.org.za/ http://www.climb.co.za/directory	
Climbing ice	http://kzn.mcsa.org.za/	http://kzn.mcsa.org.za/ & http://www.climb.co.za/directory.
Hiking		http://kzn.mcsa.org.za/
Scrambling	N.A.	N.A.
Horse trekking		

Continued on next page

Land adventures	Contact numbers or contact website	WWW-information on associations and other useful information
Hunting professional with firearms	Eduard Katzke Telephone: +27 (0) 126672048	N.A.
Hunting professional with crossbow		
Hunting professional with full bow		
Hunting professional with camera	N.A.	
Natural world (birds, flora)	Botanical Society of South Africa Telephone: +27(0)333940210	http://birdlife.co.za
Natural world (conservation)	N.A.	N.A.
Natural world (marine)		
Natural world (safaris)		
Rap jumping		
Trekking		
Events or festival		
Land Cycle		
Cycle mountain	Martin Fourie Telephone: +27 (0)833000527	http://www.cyclingkzn.co.za/information_mtb.php
Cycle road racing	Stephen Marnewick Telephone: +27 (0)828202342	http://www.cyclingkzn.co.za/

Where 'N.A.' was inserted in a cell, the tourist should contact the TKZN regional manager. The categories discussed above can potentially be linked to adventure features that relate to spatial layers in the GIS. For example, the activity of climbing is related to the feature (or layer) high mountains in the GIS. A spatial query can link the feature to the activity. Sections 4.3.3 and 5.4 elaborate on how this is achieved in a mobile GIS environment.

Categories 2, 3 and 4 specifically target the adventurer during his/her travels. These reminders considered the knowledge pool discussed in Section 4.2.1, and especially the categories adopted from the Safety Tips for Tourists brochure (TKZN, 2009a).

4.3.2 Category 2: Safety of the adventurer

Topics addressed are focused on the arrival of the adventurer at the airport, passing through built-up areas, hiring a taxi to an accommodation point, sleeping in and waking up in KZN and hiring a car and driving to an adventure destination.

Key words in the 'related spatial feature' column (shown in Table 4.3) can relate to spatial layers in the mobile GIS. In a real-life application, being within a predetermined distance from an adventure feature will trigger the corresponding message from the database containing the message prompts (see Table 4.3 below). The following layers were adopted to show how sending information prompts could (potentially) be triggered in a mobile GIS environment (built-up areas, adventure hotspots, streets, airports, accommodation and TKZN Shot-left sign boards. The TKZN Shot-left signboard layer serves as an example. These boards are strategically located route indicators found along tourism corridors in KZN. A GIS can be used to geo-code the locations of these signboards and to send location-based information when the adventurer is within a predetermined distance from a signboard.

4.3.3 Category 3: Responsible treatment of the traditional cultural environment

The topics addressed in this category focus on speaking the local language, greetings and fitting in, locals' perception of tourism, games and songs and local food and drinks.

The majority of remote pristine hotspots identified in the GIS application (as discussed in Section 3.2) fall in or are in close proximity to a Zulu village (see Figure 3.15). Furthermore, the Zulus are traditional in their belief systems and way of life. The Zulus (especially in the remote areas of KZN) still practice ancient rituals that are difficult for foreigners to understand. The foreign adventurer would in all probability experience a degree of culture shock when intermingling with the Zulu culture.

Similar to categories 1 and 2, keywords in the 'related spatial feature' column can be linked to spatial layers in the mobile GIS. Topics in this category focus on speaking the local language, greetings and customs, games, songs and literature, locals' perception

of tourism and local food and drinks. There are instances in category 3 below (Table 4.4 (a) to (e) that refer to all the spatial layers in the GIS. The GIS layers used for this category are airport, tribal authority and commercial tourism point of interest (POI). Table 4.4 (a) to (e) provides a collation of the information prompts and sources.

Table 4.3: Category 2 information prompts — safety of the adventurer

Category	Related spatial feature	Message prompts	Source
1. Arrival at the airport	Airport	When in transit, invest in tie-ups or bag locks. Spend your spare time stitching your name on your bag.	TKZN 2009a
2. Passing through built-up areas	Built-up area	Indulge in fun. Beware of illegal substances. Familiarise yourself with the laws so that you do not commit any act considered criminal by the law of the country you visit. Refrain from trafficking in illicit drugs, arms, antiques, protected species and products or substances that are dangerous or prohibited by national regulations.	Global Code of Ethics 2009
		If you plan to walk alone through rural or urban streets, do so inconspicuously, blend in and smile at locals. Be conscious of the space around you. Carry what money you need and never publicise your valuables.	TKZN 2009a, b
3. Sleeping and waking up in KZN	Accommodation	When at your accommodation destination, respect the house rules. Knock before entering and check before opening.	
		Your luggage is your responsibility. Leave your valuables in the accommodation lockers. Africa does have many insects and there is a good chance that they will get into your bags; zip up when not around.	
4. Hiring a car and driving to an adventure destination	Street	Be spontaneous, it always leads to surprises. If it leads to a dead-end, take it in your stride. Take trip notes while driving to your destination; useful roadside numbers, such as guesthouses, could come in handy if you get lost along the way.	TKZN 2009a, b & personal observations
		With regard to big horses and carriage trucks - if you cannot see their side-mirror, they cannot see you!	Personal observations
Continued on next page			

Category	Related spatial feature	Message prompts	Source
5. TKZN Shot-left signboards	TKZN Shot-left sign boards	Batho pele: putting people first. Everyone should get his/her fair share. Remember this: establishment owners are obliged to hire, promote and educate locals in tourism skills.	DEAT 2002
		Go with your gut feeling; when in doubt, ask a local or call the regional tourism manager at TKZN.	Personal observations
		You are your own responsibility; try not to rely on one source of information for directions. Use hard copy maps, guidebooks, Internet sites, GPS systems and word of mouth (On the Street with TKZN brochure: safety tips for tourists).	TKZN 2009a, b

Table 4.4 (a): Category 3 information prompts — speaking the local language

Category	Related spatial feature	Message prompts	Source
Speaking the local language	Airport & tribal authority	Use airport-accredited taxis. Use the opportunity to practise the local greetings with the taxi driver and engage in conversations. You and the locals are curious beings, so try to break the ice by showing them you have tried to learn the local language.	DEAT 2002
	Commercial tourism POI	Your experiences and knowledge can do wonders in helping local entrepreneurs improve the business. Share your knowledge and, if time permit, your skills with the locals.	
	Tribal authority	If you do not have a hard copy IsiZulu-English dictionary, use the Internet and source one, take notes and keep practising. You will make many mistakes; just keep showing the locals that you are trying!	http://isizulu.net/

Table 4.4 (b): Category 3 information prompts — greetings and customs

Category	Related spatial feature	Message prompts	Source
Greetings and customs	Tribal authority	Greeting the elderly is a norm. Notice how the locals greet each other - strangers greeting strangers. This is commonplace in KZN. Do not be shy; a nod and a smile often lead to an unexpected memorable experience.	http://library.thinkquest.org/27209/inind.htm & personal observations
		The Zulus use colourful beads and dress equally colourfully. The customs and traditions have stood the test of time. Appreciate it and learn from them. For example, different bead colours have different meanings. Read and learn about the different meanings and connotations. You will be treated with much respect if you show the locals that you are aware of these customs and traditions.	http://library.thinkquest.org/27209/Customs.htm

Table 4.4 (c): Category 3 information prompts — games, songs and literature

Category	Related spatial feature	Message prompts	Source
Games, songs & literature	Tribal authority	Evenings in Africa will involve fires, dance and song. There is a wide variety of traditional songs that you can learn and recite. The locals will be duly impressed with your efforts. The songs give a deep insight into the Zulu way of thinking.	http://www.canteach.ca/elementary/africasong.html
		You will often find that the youth are very curious and will try to interact with you. Apart from the basic Zulu words you have learnt, perhaps read and learn about Zulu traditional games. Try it with the local kids. It could prove to be a very memorable life experience!	http://www.canteach.ca/elementary/africa.html
		KZN has a colourful history that is documented in literature spanning hundreds of years. Places in KZN influenced writing, and simultaneously writing created places. Researchers from the local university (UKZN) compiled a portal of tourism literature. View the website and make an effort to enlighten yourself with the vast amount of valuable information available. Inform as many other travellers as possible about the contents of this site. Contact the UKZN team for more in-depth assistance. Telephone: +27(0)31 260 2308 (Lindy Stiebel).	http://www.literarytourism.co.za/

Table 4.4 (d): Category 3 information prompts — locals' perception of tourism

Category	Related spatial feature	Message prompts	Source
Locals perception of tourism	Commercial tourism POI & tribal authority	As far as possible, support locally made goods; the proudly South African brand is an information portal relating to brands and products made and produced in South Africa by South Africans. Buy locally made goods and use locally provided services from locally owned businesses wherever quality, quantity and consistency permit.	DEAT 2002
	Tribal authority	Locals are very aware of the economic benefits that tourists bring to the area. However, this can lead to locals becoming overly dependent on tourism, which, like fashion, will come and go. Be wary of this and talk to locals who are willing to listen. Make them aware that it is their traditional way of life that needs to be preserved as far as possible. Perhaps the 21st century requires a balance; talk to your tour guide about this.	Refer to Section 2.3.2 and personal observations
		Remember the saying: 'Fascination with the unknown'. Locals are not familiar with your ways; the way you dress, talk and walk are mentally 'absorbed' by the locals. Some would say that Africans have an ideal to follow the Western way of life. Beware how you make your presence felt. Simple things, like listening to your mp3 device around locals, could have a ripple effect. The local children would now, instead of spending their savings on more traditional luxuries, seek to buy expensive music players!	
		In other countries where locals are experienced in handling passing tourists, it is common to find a situation where locals are initially friendly when asked to pose for a picture together with the tourist. With time, they change their tone and demand reimbursement. This may not be the case in KZN yet, since locals did not yet latch on to the tricks they can play on you. Do not abuse this luxury, and be careful when approaching locals for group photos. Always put yourself in their position; if you were walking home from school, minding your own business and suddenly a group of trigger-happy foreigners start snapping photos of you ... would you like it?	Refer to Section 2.3.2 and personal observations

Continued on next page

Category	Related spatial feature	Message prompts	Source
Locals perception of tourism	Tribal authority	The fact is that South Africans have been content with their way of life for centuries. Their exposure to the Western ways of life happened only decades ago, and the consequences are evident. Kids will run behind your car, hoping for money, sweets or anything you are willing to give away. A tip - sweets give kids rotten teeth and the parents cannot afford dental care. However, a pen and piece of paper may inspire a kid towards seeking education. Always think practically!	Personal observations
		You may have a penthouse flat, a car and an Alsatian called Spud. You may wear Levi jeans and Nike shoes. This, however, does not mean that the locals are less fortunate than you. They own cattle and belong to a land intangibly rich in culture and tradition. Ignore your luxuries and travel with an open mind, breathe the fresh air and realise that a simple way of life does not necessarily mean that the person/family is suffering.	Spenceley, 2008:10 and personal observations
		The rural poor of Africa often have little choice but to choose immediate economic benefit at the expense of long-term sustainability of their livelihoods and that of the natural environment. Be aware of this and ask your tour guide how to be a positive influence on the local population.	Spencely, 2008:14

Table 4.4 (e): Category 3 information prompts — local food and drinks

Category	Related spatial feature	Message prompts	Source
Local food and drinks	Tribal authority	The Zulus eat inyama (meat), ubhonisi (sugar beans) and puto (maize). There is room for trying new dishes in new places; it is part of the adventure. Just be careful - treat your stomach with care!	http://library.thinkquest.org/27209/Diet.htm#Beer
		It is the women's duty to make the local beer. Every family makes their own beer, and it is customary to greet guests with a pot of homebrewed beer. There are local shebeens (bars/taverns), which are an experience of a lifetime. Before venturing into the local shebeen, ensure that you taste the local brew beforehand; it could mean the difference between walking out or crawling out!	
		You could try a variety of dishes. Some Zulu dishes contain a great deal of carbohydrates. A common saying that describes the variety of bean dishes is, 'Thundering buttocks!' Be gentle on your stomach; invest perhaps in a pack of Eno's or Rennies (stomach calmatives).	

It is important to note that an adventurer would pass through a tribal authority on many occasions along his/her travels in KZN. The delivery of information prompts will depend on the functionality of the mobile GIS framework. Ideally, the functionality will be set to send one or a continuous flow of information relating to the tribal authority. This functionality concerning information filtering will be discussed in Sections 4.3 and 5.2.

4.3.4 Category 4: **Responsible treatment of the natural pristine environment**

The topics addressed in this category relate to activities on land, in the water and in the air. The topics at level 4, like levels 2 and 3, are related to the spatial features in the environment. This level is arguably the most important because the adventurer is, by definition (see Section 2.2.2), interested in the natural outdoors. Similar to categories 2 and 3 above, keywords in the 'related spatial feature' column can link to spatial layers in the mobile GIS. The framework of the mobile GIS can be set up with spatial queries to ensure that the information prompts are sent at the opportune time and that messages are not duplicated. There are instances in category 4 (Table 4.5 (a), (b) and (c)) that refer to all the spatial layers in the GIS. The GIS layers used for this category are listed below:

- wetlands,
- perennial water bodies,
- rivers,
- fauna and flora sites,
- geological areas,
- sandy beaches,
- rocky beaches,
- pebble beaches,
- low mountains,
- high mountains,
- national heritage sites,
- streets (gravel roads),
- conservation areas,
- waterfalls, and

- caves.

Table 4.5 (a): Category 4 information prompts — in the air adventures

Category	Related spatial feature	Message prompts	Source
In the air	High & low mountains	Paragliding is probably the most affordable form of free flight. It would be advisable to check the weather conditions before you plan to take the trip to the destination. Contact the weather services and plan.	Cornhill et al., 2007
		The Drakensberg provides a backdrop for some intense weather systems. Thundershowers, lightning and berg winds are common throughout the province; check the weather before you plan your day and carry appropriate clothing with you. Remember, a thundershower is normally a short spell of rain, but the heavens open over Africa and there is plenty of water in a short period of time. Prepare to get drenched!	Personal observations

Table 4.5 (b): Category 4 information prompts – on land adventures

Category	Related spatial feature	Message prompts	Source
On land	Conservation areas	Hike in parties of three or more. All refuse must be taken back to the camp for disposal. Ensure that a park register is signed before you hike, and that someone in the destination management knows your plans for the day.	Ezemvelo KZN Wildlife, 2009a
		The wildlife have their own 'personal space', and you are in it! Speak softly, drive slowly and do not try to grab their attention. Do not touch wildlife; habituating them to humans can upset their natural diet. This can shorten their lifespan and cause trouble for other visitors by making the animals unnaturally aggressive. Never touch the wildlife, unless your tour guide says otherwise. (Diseases can pass from animal to human and *vice versa.*)	Intrepid Travel, 2010
		If you are lucky enough to see a lion or a leopard hunting, count yourself fortunate. Too often tour operators will try to get as close as possible. If you notice a lion stopping, smelling and listening, it is probably because of you and the vehicle you are in. Switch off the vehicle and request everyone to be as quiet as possible.	

	Gravel roads	Quad biking, mountain biking and off-road vehicles allow adventurers the opportunity to see some extremely pristine environments. It unfortunately also has the potential to destroy rare species and damage sensitive ecosystems. Never, under any circumstances, ventures off the designated path. If you are caught, authorities will have no other choice than to implement harsh penalties.	Cornhill et al., 2007
	Mountain high, mountain low	Abseiling and rock climbing is extremely popular. Find out whether your tour provider has the necessary qualifications, and check all your equipment. Erosion is most likely to occur in areas where climbing is rife; report the location to the tourism authority.	Personal observations
On land	All	Help to preserve natural environments. Protect wildlife and habitats and do not purchase products made from endangered plants or animals.	Global Code of Ethics, 2009
		Tread lightly - you are in someone else's back yard. The coastlines, mountains and wetlands belong to the locals.	DEAT 2002
		You are not allowed to make fires in undesignated places. If you are in an area where fires are allowed, never leave it unattended, as it can cause veld fires that can cause massive destruction to the natural environment.	Ezemvelo KZN Wildlife, 2009a
On land		Before colonialisation, the isiZulu worshipped the natural elements and the animals that roamed the land. There still is an unspoken, deep spiritual connection between the Zulus, the natural elements and African animals. Put yourself in the shoes of the traditional Zulu and experience the spirituality of Africa.	Spenceley, 2008:62
	Caves	Respect the rules handed out to you by the conservation team at the destination. If there are cave paintings, do not go too close to the paintings, as your breath and body heat affects the sustainability of the paintings.	Personal observations
	Waterfalls	Waterfalls are enchanting and valuable in maintaining the ecological integrity of the region. Respect this fact! Enquire from local experts where the best locations would be to swim.	

Table 4.5 (c): Category 4 information prompts — in-the-water adventures

Category	Related spatial feature	Message prompts	Source
In the water	Beach	The ocean waters are warm all year round, and swimming is high on any adventurer's 'to-do' list. Observe the beach behaviour, the water 'lives' and breathes according to the tide and the shape of the land. The tides can often play tricks on your eyes; ask the lifeguards about the backwash and stick to the markers.	TKZN, 2009a, b & personal observations
		Surfing and kite-surfing are all possible in KZN. If you plan to undertake these activities, check the local conditions. Please surf at supervised spots. If you insist on surfing at isolated spots, make sure you have the competence and, more importantly, inform someone at your accommodation establishment about your plans.	TKZN, 2009a, b
		Fishing along the coast requires a permit and in-depth preplanning research. Try not to fish alone, or let someone know where you will be. There are plenty of local fishing associations who have vast amounts of knowledge. Remote fishing spots are ideal spots for petty crimes, so beware of becoming a victim.	KZN , 2009a
	River	The rivers flowing from the Drakensberg to the coast are powerful and provide ample opportunity for rafting, tubing and kayaking. Rapids are graded from 1 to 6. 1 being quiet moving water and 6 offering extreme excitement and challenge. Enquire from the tour provider about the state of the water. It is also crucial that you mentally prepare yourself for what is to come.	Cornhill et al., 2007
		Fishing along the rivers of KZN is common. Remember that there are certain times of the year when fishes spawn, and it is advisable not to undertake fishing during these periods. Enquire from your local tourism guide where the best locations are and, more importantly, whether a permit is required.	Personal observations
		Fly-fishing spots in conservation areas or in private game reserves is fast becoming popular. In most instances, the location is man-made and stocked with fish. Observe the surroundings and ask the local conservation officer about the best locations and, more importantly, whether a permit is required.	

In this section, the guidelines adopted from Jamieson (2006) were used to collate information prompts for the adventurer. The sources of the information prompts were gathered from existing literature, hard copy brochures, WWW sources and personal observations. The information prompts can, in a real-life setting, be linked to a spatial feature in a GIS. It is now possible to access GIS information through a mobile device. In the following section, a set of mobile GIS framework criteria (relevant to the adventurer in KZN) will be discussed. This conceptual framework can use the information prompts as well as other niche technological possibilities.

4.4 Methodology - Establishing a framework for a mobile GIS in KZN (component two of Objective two)

4.4.1 Methodology – Exploring the knowledge pool on Mobile GISs and other relevant applications (data collection)

The applications reviewed in this section constitute the guiding 'ingredients' for the framework for the mobile GIS for the adventurer in the KZN context which is elaborated on in the following section.

Jamieson (2006:169) summarised the proposition of communicating information using the digital realm of the WWW: "once a model exists, relevant information can be incorporated into a comprehensive database that provide tourism operators and planners with valuable online decision support". This section will examine the details of mobile GIS applications, specifically those applications that are relevant to tourism. As was mentioned in Chapter 2, mobile technologies are a rapidly evolving industry. The technology is bound to have a positive impact on the tourism industry, which by nature involves movement from an origin to a destination.

Before the advent of dedicated mobile GISs for tourism, dedicated satellite navigation devices were one of the key tools for the tourist and adventurer. Magellan® and Garmin® are some of the more renowned satellite tracking devices. These devices have come a long way since their conception and are likely to remain some of the trusted sources for outdoor navigation for years to come. Nowadays, systems such as

Garmin® and Magellen® have dedicated units for travellers and adventurers alike, with sturdy rugged devices and tourism-specific data sets (Magellan, 2011; Garmin, 2010).

As stated in the literature overview (Section 2.5.3), advancements in technologies are more than likely going to further revolutionise the mobile computing field. These include "visitor guides for cities and museums, car navigation systems, assistant systems for conference participants, shopping assistants and even wearable applications" (Christopoulou, in Lumsden, 2008:188). Recent trends suggest using the users' location in order to improve the service provided. Smart phones, such as the iPhone®, Blackberry®, Nokia® or those phones using the Android® operating system (Samsung®, HTC®, Sony®), have cameras as eyes, microphones as ears and sensors that gather intelligent information from the environment (Buhalis & Pistada, 2008).

Since the advent of mobile context aware systems, there have been a number of applications such as tour guides (Abowd et al., 1997; Cheverst, Davies, Mitchell & Friday, 2000) and reminder systems (Dey & Abowd, 2000; Lammings & Flynn, 1994), mobile services for cruise ships (Dickinger & Zins, in Egger & Buhalis 2008:427-434) and mobile lifestyle assistants (Fleischhacker, in Egger & Buhalis 2008: 436-444) and mobile destination management solutions for tour operators and agents (Schröder, in Egger & Buhalis 2008: 445-456) . With regard to tourism-related systems, it was documented by Buhalis and Pistida (2008) that context-based information systems still have a long way to go.

Goosen, Lammeren & Ligtenberg (in Gretzel et al., 2010:111) review the interactive Location based Service (iLBS) application called the Digital Dowsing Rod (DIWI). In this service, "the user is no longer simply the consumer of location and of context dependent information via push and pull interfaces, but also becomes a participant in collecting and reviewing information" (Goosen et al., in Gretzel 2010:111). The DIWI allows the user to upload information on the fly and not when back at home on a desktop website. The DIWI System was designed to explore the cultural heritage of a region. The DIWI application provides the traveller with the opportunity to record, store and upload

personal location-based experiences by means of text processing, voice recording, still photo and video camera. Travellers can generate their own points of interest (POIs) and share them immediately with other users reaching these locations. Other travellers with access to the DIWI application can immediately access the information. Concerns regarding the battery life of the mobile device, the connectivity to the network and stability of different servers were noted.

Communicating information to the traveller in the 21st century is an exciting prospect for anyone working in the field of information technology and tourism. One of the more unique applications is the application researched and reviewed by Canadi, Höpken & Fuchs (2010, in Gretzel, 2010:137-149). The study explored the use of QR codes in online travel distribution. QR codes are a variation of matrix codes and similar to barcodes. The only difference is that they store much more information. They vary between 2,531 characters (8 bit binary) and 7,098 characters (numeric data). The code either contains data directly or connects to an online data repository. Scanning software on a mobile phone or stand-alone device can decipher the content. Mobile tagging is fast becoming a niche way in which to link mobile services to physical objects. Currently, QR codes are used in specific closed environments such as museums, shops, cargo packages and ticket-verifying systems. In the study conducted by Canadi et al. (2010: 137, in Gretzel et al., 2010:137), QR tags were used on physical features in a museum environment. The Technology Acceptance Model (TAM) of Davis (1989) was used to evaluate the system. The biggest hurdle faced by the QR code approach is the lack of understanding of the technology and the lack of publicity. Wide-spread availability of software for creating and reading QR codes is required for the technology to take off in the market.

The Time-Treks projects (Schliesser, & Kim, in Sigala, Mich & Murphy, 2007:97-109) adopt a unique combination of stories and location to illuminate destinations rich in cultural and historical heritage. The methodology to adopt a storyline approach is similar to Jamieson's (2006) suggestion of integrating an interpretive story line approach (see Section 2.5.3). The Time-Treks mobile application allows the user to choose roles and

to enter game-like scenarios. Information about the history and interesting facts about the destination are conveyed by means of a well-structured and meaningful story. The storyline approach adopted for the Time-Treks project uses static information about the destination to develop entertaining stories around it based on extensive knowledge about the history and cultural background of the region. The value of the storyline approach is further motivated by Seymour Chatman who states that it is “a universally appealing way of organising information” (Schliesser, & Kim, in Sigala, Mich & Murphy, 2007: 101).

The MOBiLearn application was reviewed by Beale and Lonsdale (in Brewster & Dunlop, 2004). Beale & Lonsdale (in Brewster & Dunlop, 2004:240-251) noted that mobile devices, such as PDAs, mobile phones and laptops, are used by a mixture of users in diverse environments. Knowing the user’s location, and then putting it to good use, allows the MOBiLearn platform to provide timely support for user activities. It also allows the user to spend more time in the actual environment. The location of the user is relayed back to the remote data server as a coordinate. The remote server then identifies POIs that would apply to the user, given his/her profile preferences. If there is a match, information is relayed back to the remote mobile device (Beale & Lonsdale, in Brewster & Dunlop, 2004:240-251). The results of a survey done by the respondents about the usability of MOBiLearn suggest that the interface should be as user-friendly as possible. Secondly, multiple choices often distracted the user from their current situation. Other feedback suggests that users preferred to distinguish between questions, content and physical resources. The ‘all-in-one’ display seems to confuse them. Yet other feedback suggests that the system should provide a “context system for users across multiple activities, episodes and projects, with the history of previous support playing an integral role in determining future actions” (Beale & Lonsdale, in Brewster & Dunlop, 2004:240-251).

The UbiquiTO application was reviewed by Amendola et al. (in Brewster & Dunlop, 2004:409-413). UbiquiTO is a multi-device adaptive guide aimed at integrating “different adaptation strategies in order to allow high flexibility in terms of device used, localisation

technology, user preferences and context conditions" (Amendola et al., in Brewster & Dunlop, 2004:409-413). The ability to locate the user in the environment provides the opportunity to further investigate the users' characteristics and preferences. The UbiquiTO has the following core characteristics:

- information is delivered based on the location of the user;
- the application adapts to different devices;
- user profiles, such as users' interests, preferences and previous visits are considered; and
- context parameters such as the time of day and the movement patterns of the user are simulated by the application software.

The UbiquiTO adopted two methods to identify the users' location. Firstly, considering that some mobile devices do not have automatic positioning functionality, the user is given the opportunity to choose the nearest location from a drop-down list or by clicking on an online interactive. Secondly, with wireless LAN, the user can activate the WiFi receiver that can relay back location information to the remote server (Amendola et al., 2004, in Brewster & Dunlop, 2004:409-413).

Campbell and Tarasewich (in Brewster & Dunlop, 2004:3) focus on the dimension limitations of the mobile device. The amount of information displayed on the phone was identified as the main limitation. With the amount of information available through online sources, it is easy to imagine the user being inundated with information not entirely relevant to the context. Campbell et al. (in Brewster & Dunlop, 2004:1-12) suggest that a user may not necessarily be interested in the entire content of a message every time one is available. However, the user may want to receive a notification prompt when a message is available, along with an indication of how important it is and the source of the information. Determining what is important and what not in a ubiquitous environment can be a complex task. A probable method would be to sift through available data-base information and deliver what is deemed to be useful, depending on the user's profile and location. The study by Campbell et al. (in Brewster & Dunlop, 2004:1-12) presents a novel approach, using three coloured lights to send cues to the user. Each light has a

level of importance, and the user immediately knows the category of information available. This approach is ideal for notifications on small devices, since “small lights (e.g. LEDs) can be embedded in any small device or product” (Campbell et al., in Brewster & Dunlop, 2004:3). The cues can be sent quietly and instantaneously to the user’s device.

Another mobile application, Cyberguide, consists of four independent components: a map, an information base, a positioning system and a communications system. Cyberguide uses information about the user’s location and the history of past locations. This information is queried and analysed and applicable user information sent back to the device. The Cyberguide project team learned three major lessons from the initial pilot phase. Firstly, existing technology advancements allow developers to design and implement cost-efficient mobile devices. Secondly, knowing exactly where the user is located is not necessarily that important. It is far more important to know what the person looked at in the past, what he/she is looking for in the present and what he/she would want to know in the future. Once the past, present, and future bits of information are known, a profile of knowledge is built around it. Thirdly, it is important to separate the positioning system and the communication system (Abowd et al., 1997).

The European commission, as far back as 2003, compiled a report on the research and development activities carried out specifically with regard to intelligent systems for tourism (European Commission IST, 2003). Some of the more applicable applications to this research will be discussed in the paragraphs that follow.

The main objective of the Hamonise, Fetish and Dafne (European Commission IST, 2003:7) applications was to “to reduce the fragmentation of tourism information systems” by using semantic algorithms to pull information from a number of relevant tourism portals on the WWW. Travellers have the opportunity to choose their ideal online portal depending on their personal likes or dislikes. This is used when filtering information to the device. The projects used open source platforms and shared a common goal in order to “turn fragmented and diverse tourism information systems and

value added services into a seamless landscape of interoperable resources" (European Commission, IST, 2003:7-8).

The Dietorecs, Hitouch mobile tourist guides assists the tourist in choosing a destination once he/she creates a profile. The Wham, Palio, Crumpet, Ambiesence, Estia, Etour and Hypergo applications also use user profile details to streamline LBS content for the mobile tourist guides before, during and after the trip. The Tourserv, Webpark, PARAmount and Tellmaris tourist guides specialise in three-dimensional (3D) representations of surroundings. For instance, Tourserv developed an open platform specifically for Alpine mountain tourism resorts. It allows for pre-trip planning and the viewing of 3D maps during the tourists' sporting activities in the immediate surroundings (European Commission IST, 2003).

Paramount and Webpark are designed specifically for open 'touristy' areas such as parks. The applications provide services such as "map download, position information, places of interest, routing and guidance, 3D visualisation and avalanche prediction" (European Commission IST, 2003:8). The main focus of Paramount and Webpark is on safety and rescue services for hikers and mountaineers. Another mobile application, Ambiesense, uses a niche approach for delivering context-rich information to the mobile device. Context tags are placed at strategic points at the tourism destinations. WiFI technology allows the mobile device to pick up the location-based information. The wireless markers are attached to buildings, furniture, restaurants and vehicles. The markers are visible to the mobile device, which is set up to receive the information (European Commission IST, 2003).

Applications such as Estia, Wham and Travelsmart are aimed at providing mobile access to back office systems such as bookings, payments, marketing and customer relationship management. This is quite indicative of the evolution of mobile technology, for example, providing as many inter-related services to the traveller as efficiently as possible. The Estia application, for instance, has integrated an auction service,

“enabling tourism service providers an opportunity to dynamically interact on proposed offers” (European Commission IST, 2003:8-9).

Urban tourism is targeted by applications such as Palio, Capital Itts, Ambiesense, Estia, Wham, Etour, MTourguide and Archeoguide. The cultural assets of the urban areas are addressed specifically by Archeoguide and Etour. Tourists in large European cities are targeted in the Capital-Itts mobile application. The application integrates information from a variety of sources such as local traffic, coach parking, points and events of interest, together with topographical information. These sources provide the local context of the tourist (European Commission IST, 2003).

Vmart and Odin focus on rural tourism, whereas Webpark and Regeo consider tourist requirements in open areas (European Commission IST, 2003). Tourserv and Paramount focus on mountain tourism. Waterborne tourism is dealt with by Tellmaris 9 and Eureauweb. Tellmaris 9 provides 3D maps of the Baltic Sea by means of mobile devices. Eureauweb focuses on the tourists using the waterways in Europe. Eureauweb enhances the travel experience by providing a portable audiovisual device that offers data resources for download before and during the trip, such as places of interest, restaurants, service points, wildlife and travel activity data (European Commission IST, 2003).

In his thesis, Grun (2005) provided an in-depth review of the following mobile tourist guides: Compass, Crumpet, the Guide system, Gullivers Genie, Lol@, Mobidenk, m-ToGuide, Pinpoint and Sighteseeing 4U. The more pertinent characteristics of the applications will be reviewed in the paragraphs that follow (Grun, 2005).

Tourism is a social function, since travellers tend to stick together in groups, and often tend to interact with people with similar travelling characteristics. Grun (2005) suggests that systems should do more than locate nearby travellers with similar characteristics. The system should allow the like-minded users to communicate by instant messages. Regionalising the spatial data, such as where the restaurants and nightlife clusters are

located, in a mobile tourist guide will be useful. Zoning cities into regions with similar characteristics will allow the user to get an overview of the city's morphology. Entering restaurant and nightlife zones can modify the data requirements; suggestions can be made through the spatial data server regarding possible alternatives and attractions inthe region that match the users' profile (Grun, 2005).

As discussed in Section 2.5.3, the delivery of information to the mobile device depends on the connection to the remote data servers and the capabilities of the processor and memory. The functionalities of the device should take into account the connection issues such as bandwidth and network connection. The choice is between two modes: having a permanent connection to the data server or downloading and saving the data on the phone as the user traverses the destination. The former would best work in cities and smaller areas with stable connections. The latter would be ideal in larger areas where unpredictable connections could affect the accurate supply of travel information. Sightseeing 4U is one of the devices that can switch between both modes, depending on the context of the location (Grun, 2005).

The system design of Compass and Crumpet allows the user to incorporate external web services by means of the applications. These external web services are sourced by Semantic and Ontological searches built into the application. Sharing spatial information is standardised by organisations such as the Global Spatial Data Infrastructure (GSDI). The Open Geospatial Consortium (OGC) uses these standards and provides a variety of open source platforms for web and mobile services. Most of the systems that Grun (2005: 39) evaluated used propriety GIS platforms. Of all the applications reviewed by Grun (2005), only the Mobidenk application used the Web Map Service (WMS) offered by Open Geographic Consortium (OGC). By using the WMS Service offered by OGC, the mobile device has access to core location services, including route planning, location utility, presentation and directory services.

Time and network context is important in the design of a Mobile GIS tour guide. In Grun's (2005) review, only M-to-Guide uses time in an effective manner by informing

the traveller of the start and end times of tours. A device adapting to the network context is important, especially in rural areas. Mobile devices use either location-based services, satellite or network sensors to determine the user's current position. Grun (2005) states that the device should adapt to the network fluctuations. M-ToGuide shows symbols on screen to keep the traveller aware of the status of network connectivity.

In advancing technological times, more location and user-context factors can be used. The location can be further fine-tuned by using all existing network options, such as GPS, WiFi or UTMS (as explained in sub-section 2.5.3). The user preference can be modified by using a combination of factors from past and existing choices. The application can calculate the speed of the traveller and determine whether the traveller is walking or driving in a vehicle. The application adapts the information according to the mode and speed of transport. The majority of the current approaches use "historic contexts for updating user profile" (Grun, 2005:41). Future movements and trips can be pre-determined by the traveller's reservations or past web searches. The application can pre-cache the information and suggest possibilities at logical phases of the journey (Grun, 2005).

Profiling the traveller, as mentioned earlier, is crucial to fine-tuning the data that is delivered to the travellers' mobile device. Sight-Seeing 4u uses user profiled information. User context is usually obtained in a semi-automated way. The user, in most instances, completes an initial profile that is feeded into the system and stored against the user's profile. Different to that, m-ToGuide assigns the user a default personal profile according to the kind of trip - family or business trips (Grun, 2005).

All approaches that Grun (2005) evaluated support pull-based technology: that is, the system sends information to the user depending on the context. Only a few approaches use push-based technology; that is, allowing the user the opportunity to send queries and requests to the data servers. Travellers are often interrupted during their tours and deviations are made from the pre-determined itinerary. This is not ideal since "the

system should recommend tours more suited to the permanently changing context conditions" (Grun, 2005:42).

Some interesting applications are setting trends and take advantage of geographic information and technology. The first is Foursquare (Foursquare, 2011). This application allows the user to tag a location flag at a particular restaurant or pub on a mobile application. The mobile device is used to locate users and a point is allocated to their profile. Participating establishments offer meal and drink vouchers to regular customers. Another application is GeoCaching, which is based on the more traditional "treasure-hunting" game. Locals or travellers can leave a 'geo-cach' at an approved location, and passing users have the opportunity to use the clues and the GPS device to locate the treasure. In South Africa, the 'On The Grid' application (On The Grid, 2010) is a simpler (but effective) way to locate users on a map and link to and find friends who are close by to synergise content from other social media network sites such as Facebook and Twitter.

In this sub-section, some of the more important mobile applications relevant to tourism were reviewed. Some of the characteristics of these mobile applications will be used as ingredients to achieve research Objective 2, which is to conceptualise a framework for a mobile GIS. In the next section, the focus will change to the design of the framework for a mobile GIS.

4.4.2 Structuring the knowledge pool - towards the mobile GIS framework

Ultimately, the responsibility rests on the visitor, for it is up to him/her to 'want' to act responsibly, which is not necessarily the case with all travellers. The impact or effectiveness of the message can also have an effect on the individual's choice to visit, his/her preparation, as well as actual behaviour during the visit. Moscardo (1999) goes further and suggests that an effective message should have the following elements:

1. variety and change;
2. use of multi-sensory media;
3. novelty, conflict and surprise;

4. use of questions;
5. visitor control and interactive exhibits;
6. connections to visitors; and
7. good physical orientation.

The first step towards proposing a mobile GIS framework is to summarise the relevant adventure traveller characteristics. These characteristics are perceived to have an impact on the framework criteria of a mobile GIS in the KZN context. The key adventure traveller characteristics are listed in Table 4.6.

Table 4.6: Adventure traveller characteristics

Criterion	Adventure characteristic	Source
1	The adventurer is a **knowledgeable**, **dynamic** traveller	Boniface (2001:1-17)
2	The adventurer wants to experience an adventure filled with elements of **spontaneity**	Swartbrooke et al. (2003:9)
3	The adventurer is most likely to experience a degree of **culture shock** when interacting with locals from remote destinations	Reisinger et al. (2003:50-52)
4	The adventurer is not dependent on technology, but is in all probability **technically proficient**	Boniface (2001:17-18) & Swartbrooke et al. (2003:161-162)
5	The adventurer is eager to experience a **risky situation** (need for adrenalin) during his/her adventure	Zuckerman (1979) & Swartbrooke et al. (2003:77)
6	The adventurer is likely to venture **off the beaten track** into the remote	Millington et al. (2001:65-66)
7	The adventurer can often land up in areas where his/her **well-being** (safety) is at risk.	Ryan, in Wilks & Page (2003: 58-60)

The second step is to review the key theoretical guidelines relevant to the design of a mobile application. The first guideline is the Human Computer Interface (HCI) (Grun, 2005:49-50). The second guideline is the specific criteria for tourist mobile devices (Grun, 2005:17-21). The third guideline is the Technology Acceptance Model for Mobile Services (TAMM) as an extension and modification of the Technology Acceptance Model (TAM) (Kaasinen, in Lumsden, 2008:102-118). The key constituents of these models were discussed in Section 2.5.3. The theoretical guidelines applicable to the mobile GIS framework criteria (for the adventurer in KZN) are summarised in Table 4.7.

Table 4.7: Summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN

Source	Framework for mobile GIS	Key elements
HCI guidelines (in Grun, 2005:49-50)	Easy to learn	Effortless to learn
	Provide status information	Change of network connectivity
Grun (2005:17-21)	Tourism as a social activity	Group-interaction - friend finder
	Kind of tourism information	Proactive tips, thematic layers, spatial proximity calculations
TAMM (Kassinen, in Lumsden, 2008:102-118)	Perceived value	Personalised fun with comprehensive personalised information
	Trust	Estimated accuracy should be revealed, privacy of user paramount, be in control

The third and last step of the proposed conceptual framework is to relate existing mobile GIS applications and other applicable WWW sources (as discussed in Section 4.3.1) to the adventure characteristics and applicable theoretical guidelines. The method adopted for the mobile GIS is summarised in Table 4.8.

Table 4.8: Towards a mobile GIS framework.

Steps	Description	Sources
1	Typical adventure characteristics	Table 4.6
2	Summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN.	Table 4.7
3	Relevant mobile GIS applications and other applicable WWW sources	Section 4.3.1

The method to be used for a conceptual mobile GIS framework for the adventurer in KZN was described in this section. The results of the adopted methodology will be discussed in the next section.

4.5 Results: the framework criteria for a mobile GIS in KZN

Swartbrooke (2003:147) proposed that conventional information, such as guidebooks, travel writing, specialist magazines and television adventure travel programmes, often fail to give travellers information that will make them sensitive and responsible travellers. With niche geographic technological tools, there is an opportunity to use a mobile GIS to ‘sensitise’ the adventurer to important information during the actual

journey. In this section, a framework for a mobile GIS devoted to the adventure traveller in the KZN province is discussed.

It is beyond the scope of this research to review the best software and hardware requirements. However, it is important to have a basic understanding of what the trends are, especially in the TKZN working environment. The trends in software and hardware will impact on the manner in which the criteria can be adopted. A set approach is adopted for each criterion. It firstly identifies the adventure trait, followed by relating elements of the technology models and lastly existing mobile applications and other applicable WWW sources that can be used as a benchmark. This approach is summarised in Table 4.8. The criteria discussed in the following Section (4.5.1. – 4.5.7) must considered if the mobile GIS for the adventure traveller is going to be implemented successfully in the real world.

4.5.1 Criterion 1: the knowledgeable, dynamic traveller

- Step 1: adventure characteristic:
  The adventurer is a knowledgeable, dynamic traveller (Boniface 2001: 1-17).
- Step 2: summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN.
  Easy to learn (Grun, 2005:49-50).
- Step 3: relevant mobile GIS applications and other applicable WWW sources:
  The Mintel International Group (2000) noted that people are more self-independent in an increasingly consumerist society. An increase in “disillusionment with materialism, which does not always bring the fulfilment that many people anticipate” (Cater, 2006:51) is expected. There is an eagerness and desire to escape to the natural outdoors. A mobile device should therefore be as unobtrusive as possible. The focus of the adventurer should clearly be on the environment and not on the mobile device. The traveller does pre-trip research on the destination. The functionalities of the mobile GIS can create a profile for the adventurer before he/she arrives at the adventure destination. By creating a profile, the content would be filtered, and

unnecessary information would not be sent to the mobile GIS. This allows the adventurer to spend more time focusing on the beauty of the unfolding adventure.

Research by Grun (2005) found that existing mobile tourist guides have too much active interaction from the user's point of view. A typical application, such as Sight-Seeing4U, provides user profile information in different formats. User context is usually derived in a semi-automated way. The user, in most instances, "fills out an initial profile which is further updated by the system" (Grun, 2005:41). With the amount of pre-trip research done, it seems viable to provide a link between the pre-trip process and the mobile application process. Mobile applications, such as Wham, Palio, Crumpet, Ambiesense, Estia, Etour and Hypergo, use profile information and location-based techniques that streamline the content of the device before, during and after the trip (European Commission IST, 2003). This research proposes to use the adventure categories (as listed in Appendix 7) from TKZN as the starting point for collecting profile information on the adventurers' likes.

Desktop applications also take advantage of profiled content. Web portals, such as Google© and Yahoo©, integrated personalised profiled platforms and created personalised interactive platforms called iGoogle© and MyYahoo©. These sites allow individuals to change the content and look and feel of their profile page. Widgets are also becoming trendy when it comes to personalising the content available to the user (Matloka et al., 2010:518-521). Trends suggest a steady rise in spatial technologists using online mapping systems such as the Google maps API© on the Google Android mobile platform (Pejic et al., 2010). Smart-phone technology will allow travellers to easily access sites (iGoogle© and MyYahoo©) and applications mentioned in this paragraph (iGoogle©, MyYahoo©, sites with widgets and Google maps API sites). The added value is that smart-phones add location to the existing profiled content, which immediately filters the location-based information to the traveller's phone.

To conclude the discussion on criterion 1, once the profile information is stored in the knowledge base of the mobile GIS application, built-in spatial queries can be set up to trigger profile-specific information related to the information prompts described in the previous Section (4.2.3). The mobile GIS system decipher the location of the mobile device and, depending on the approximation to certain spatial layers and the set-up parameters, the GIS databases can send back context-relevant information prompts to the adventurer's mobile GIS. A typical scenario of how this criterion can work in a mobile GIS environment will be explained by an illustration in Section 5.4.

4.5.2 Criterion 2: the spontaneous traveller

- Step 1: adventure characteristic:
  The adventurer wants to experience an adventure filled with elements of spontaneity (Swartbrooke et al., 2003:9).
- Step 2: summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN:
  Perceived value (Kassinen, in Lumsden, 2008:102-118)
- Step 3: relevant mobile GIS applications and other applicable WWW:
  The adventurer wants to experience a degree of unexpected outcome. The Foursquare model (FourSquare, 2011) is a good example of how an adventurer can use a mobile device to dynamically accumulate digital vouchers based on the frequency of visits to a specific establishment. The more points gained, the better the user's chance to receive discount at a preferred establishment. A more insightful approach is required to make the adventurer feel that the mobile GIS framework criterion inspired a spontaneous travel choice. This criterion framework suggests using a mixture of QR codes technology (Canadi et al., 2010:137-149) and an approach similar to the Foursquare model.

Wilks & Page (2003) states that the adventurer is likely to also visit restaurants spend time at attractions, amusement parks, lodgings and local performances, which are also part of a normal tourist experience. This is ideal for this framework criterion. A typical scenario is described in Section 5.2, which focuses on how adventurers can

be coerced to visit specific regions that fall in the decline and rejuvenation stages of the TALC model.

4.5.3 Criterion 3: the traveller who desires to interact with the hosts

- Step 1: adventure characteristic:
  The adventurer is most likely to experience a degree of culture shock when interacting with hosts from remote destinations (Reisinger et al., 2003:50-52)
- Step 2: summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN:
  Kind of tourism information (Grun, 2005:17-21).
- Step 3: relevant mobile GIS applications and other applicable WWW sources:
  Egmond (2007) suggests that more foreigners are keen to interact with the local inhabitants and experience culture first-hand. It is a well-known fact that culture shock is one of the most recognised impacts of tourism (refer to Section 2.3.1). This is even more apparent for travellers from developed countries who visit traditional cultures of developing countries. Hofstede (1980) sums it up quite eloquently by suggesting that a visitor to a foreign culture adopts the mentality of a child and learns the simplest things over and over again, often leading to difficulty. This often leads to distress and hostility in the new environment. Furthermore, Samovar et al. (as cited by Reisinger et al., 2003:10) indicate that a relationship exists between language and cultural conflict. The huge difference between the language and culture of the local and the foreign adventurer results in probable communication difficulties, which can result in conflict situations.

  A mobile GIS can remind the traveller at opportune times of what to expect in the natural and traditional cultural environment. The application DIWI, Digital Dowsing Rod (Goosen, et al., 2010:111), is an example of how users can share media content and receive location information about the cultural features at a specific location. Another relevant application is the Time Treks project that uses a game-like scenario where the user can choose between different characters to learn about the culture in a game-like setting. Jamieson (2006) further suggests using an interpretive

storyline approach, since every community has folk stories about their history, people and cultural heritage. The important consideration for this framework criterion is to consider the foreigners' 'tourist culture'. This is important, since "tourists behave differently when they are away from home because they are in a different state of mind are in play mode. Hosts behave differently because they offer the visitor hospitality services" (Reisenger et al., 2003:10)

The content created from the category 2 information prompts (represented in Table 4.3) relates to this framework criterion. These categories are the following: speaking the local language, greetings and fitting in, locals' perception of tourism, an evolution of time, games, songs and local food and drinks. This is perceived to be a good starting point for the KZN context. Section 5.4 will elaborate on how this framework criterion can be achieved in a mobile GIS environment.

4.5.4 Criterion 4: the technologically proficient traveller

- Step 1: adventure characteristic:
  The adventurer is not dependent on technology but is, in all probability, technically proficient (Boniface, 2001 & Swartbrooke et al., 2003).
- Step 2: summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN.
  Tourism as a social activity (Grun, 2005)
- Step 3: relevant mobile GIS applications and other applicable WWW sources:
  The questionnaire responses (discussed in Section 3.3) suggest that the adventurer would probably be a technically proficient individual who uses technology on a day-to-day basis back in his/her country of residence. Ryan (in Wilke & Page, 2003:58) suggests that an adventure experience is likely to be attractive to both males and females alike, and especially to those engaged in jobs involving more white collar occupations (as opposed to physical work). In contrast, but applicable to the research, the responses also suggest that the adventurer could be an elderly person with no inkling of how to use a mobile device. Furthermore, a common consensus between the respondents is that the adventurer should not be disturbed or inundated

with information prompts throughout his/her journey. This poses a rather interesting question: how can a mobile GIS be as unobtrusive as possible, while at the same time be an effective medium to educate the adventurer about the natural and traditional cultural environment?

Two steps are suggested for this criterion. The first is to clearly demarcate the remote pristine hotspots (identified in Section 3.2) as the 'unobtrusive' layer. As soon as the adventurer enters an identified hotspot, the mobile device switches to silent or 'unobtrusive' mode. The next step is to adopt the approach suggested meanings behind each light in advance. If the mobile device enters into 'unobtrusive' mode on its own accord, it has the advantage of reminding the adventurer that he/she is entering a pristine remote part of KZN and that he/she should be more aware of his/her surroundings. This is perceived to have a positive impact on the adventurer, since he/she becomes more aware of the environment and surroundings. Furthermore it has a positive impact on the natural and traditional cultural features at a hotspot, since the adventurer would, in all probability, treat it with more care. Section 5.2 elaborates on how this criterion can work in synergy with the adventure hotspot map in a mobile GIS environment.

by Campbell & Tarasewich (in Brewster & Dunlop, 2004:3). This approach takes advantage of three colour lights that silently display on the device. Each light depicts a type of incoming message. The adventurer is made aware of the different

4.5.5 Criterion 5: the traveller who desires elements of risk and adrenalin related experiences

- Step 1: adventure characteristic:
  The adventurer is eager to experience a risky situation (need for adrenalin) during his/her adventure (Zuckerman, 1979; Swartbrooke et al., 2003).
- Step 2: perceived expectations from technology models:
  Tourism as a social activity (Grun, 2005).
- Step 3: relevant mobile GIS applications and other applicable WWW sources:

The characteristics of the typical adventurer were reviewed in the literature Section (2.2.2). It is clear that the adventurer is keen to experience an element of risk during his/her travels. Risk can lead to an accident, which is not what the adventurer wants to experience. An important sentiment relevant to this criterion is: “like the early explorers, we rely on available knowledge and technology in order to effectively manage risk” (Sir Frank Moore, in Wilks & Page, 2003: foreword). Yet again, it is an interesting predicament for the mobile GIS framework. How can the GIS lead the adventurer on a form of ‘risky path’ while somehow ensuring that it would not lead to an accident?

This framework criterion suggests using an approach similar to the Geocaching model (GeoCaching, 2010), merged with profile-specific hard copy maps (Grun, 2005). A type of geo-treasure is left at a specific location, either by a passing traveller or by locals who want to play a more interactive role. The location of the ‘treasure’ is uploaded on the web portal. Anyone who has access to the mobile GIS platform should be able to participate in finding the geo-treasure. The suggestion is to work in collaboration with the tourism stakeholders, such as TKZN and EKZW, to place a treasure at a strategic location. The reasoning behind this is to ensure that there are elements of strategic thinking and risk involved in the placement of the treasure, but to, at the same time, instil a sense of understanding for the adventurer in respect to the environmental characteristics, the carrying capacity levels in the surroundings and appropriate activity in the region (Moscardo, 1999). A scenario that shows how this framework criterion can work on a mobile GIS environment will be elaborated on in Section 5.4.

4.5.6 Criterion 6: off the beaten track

- Step 1: adventure characteristic

  The adventurer is likely to venture off the beaten track into the remote (Millington et al., 2001).
- Step 2: perceived expectations from technology models.

  Provide status information (Grun, 2005).

- Step 3: relevant mobile GIS applications and other applicable WWW sources

  Respondents who completed the questionnaire survey noted that there will be instances where the hotspots are located in regions not covered by the mobile networks. This could pose a problem to the adventurer, since he/she will most probably be venturing into the remote with low to no network coverage. A number of applications, such as UbiquiTO, Sightseeing4u, M-To-Guide and Eureaumap, took advantage of the different network connections available. Some of these options are: choosing the strongest network, using WiFi receivers and using drop-down boxes that allow the user to choose the location he/she is at (Amendola et al., in Brewster & Dunlop, 2004; Grun, 2005).

  It is important to establish the low or no coverage areas regarding the context of KZN. The functionalities of the mobile GIS can now be set to pre-empt when the individual will be entering a low to no coverage area. Necessary information pertaining to the adventurer's profile can be sent before or after he/she enters the low or no coverage area. As noted by Swartbrooke et al. (2003), a characteristic of the adventurer traveller is his/her desire to visit locations not usually visited by the average tourist. This would, in all likelihood, result in the adventurer passing through and interacting with locations where there is poor or no network coverage. A probable scenario of how this criterion will work in the real world is elaborated on in Section 5.2.

4.5.7 Criterion 7: Safety of the traveller

- Step 1: adventure characteristic:

  Adventurers can often land up in areas where their safety and well-being is at risk (Wilks & Page, 2003).
- Step 2: summary of theoretical guidelines applicable to mobile application development for the adventurer in KZN.

  Trust (Kassinen, in Lumsden, 2008:102-118).
- Step 3: relevant mobile GIS applications and other applicable WWW sources:

The theoretical framework criteria used here is the ‘trust’ category from the TAMM (Kassinen, 2008) guidelines. Mobile applications, such as Paramount, Webpark and Ambiense, were used as guiding approaches. These three mobile applications include functionalities such as avalanche prediction and context tag locators to assist in securing the safety of the traveller. Furthermore, dedicated panic buttons were used to contact a call centre operator when required (European Commission IST, 2003).

The information from category 1 prompts (see Table 4.2) is also deemed important to achieve this framework criterion. Knowing the rules, regulations and policies about a specific adventure activity can help the adventurer to identify a possible safety concern. A relevant finding from the literature review was the concern about maintenance of privacy and confidentiality. In the existing legislation in KZN, the individual would need to agree to be monitored and tracked by means of the mobile application. Furthermore, the application should be able to store pertinent personal information related to the traveller’s health issues, as well as next of kin. A scenario illustrating and explaining how this criterion would work on a mobile GIS platform in the real world is explained in Section 5.4. This will be achieved by using a buffer layer (geo-fencing) around the adventurer’s profiled start (origin) and end (destination) points, so that spot checks can be carried out on movement patterns.

In conclusion to this section, a few important points should be summarised. Firstly, every time the mobile GIS of the adventurer identifies that he/she is passing over or is next to a river, a message relating to ‘river’ can potentially be delivered to the device. In all probability the adventurer will pass over many rivers. This will result in messages being delivered to the device at every river crossing. This results in redundant or duplicate messaging, which is not ideal for the adventurer who does not want to spend too much time deleting duplicate messages or reading the same message again. He/she would most probably be more interested in enjoying the natural beauty of the great outdoors. For instance, it will be logical to send a message to the adventurer only once, in accordance with the profile of what the adventurer wants to know. This

functionality should be built into the Mobile GIS set-up. Secondly, according to Swartbrooke et al. (2003), the adventurer, when choosing a destination, will adjust according to the opportunity to be responsible. This is encouraging for responsible tourism, and more so for the opportunity to use a mobile GIS to accentuate the message of being responsible at the destination, to the traveller. Third and lastly, this conceptual framework is the result of the researcher's literature studies, personal experiences and consultations with the practitioners from TKZN. To evolve into a successful real-life application, this conceptual framework would require a collaborative effort with experts from the software and programming sides of the (mobile GIS) development cycle.

4.6 Conclusion

Conventional information is readily available through the usual sources such as books, brochures and websites. The information is mostly dispersed over a variety of sources. With technological advancement in geographic technologies, it is possible to send context-specific information to adventurers' mobile devices while they are travelling. In this chapter, the possibility to realign information so that it can be useful to an adventurer on a mobile GIS platform was examined. A number of conventional sources were used to obtain relevant information that can be used as information prompts in a mobile GIS. It is important to reiterate that the prompts given in this chapter are just examples and that in a real-life situation, more stringent data collection and analysis by experts in the field will be needed to establish appropriate prompts. In the last part of the chapter, the framework requirements for a mobile GIS were examined. The approach merged existing mobile applications, theoretical guidelines and adventure characteristics (and findings). This resulted in a set of seven criteria that brings together the essentials required for the design specifications of a mobile GIS application dedicated to the adventure traveller in the KZN province.

Chapter 5 is the concluding chapter to this research. The research process is reviewed and the results and findings discussed. The potential value and limitations of the research are then discussed. The chapter concludes with suggestions for further research.

Chapter 5 Findings and conclusions

5.1 Introduction

The aim of this research was to accurately identify adventure hotspots by using the functionalities of a GIS and to validate the GIS methodology by interviewing the tourism practitioners from the KZN province. A further aim was to show how existing media and literature about responsible travel can be realigned for eventual implementation on a mobile GIS platform. To accomplish this, the research was separated into two research objectives. The first objective was to determine the location of adventure hotspots in KZN by using the functionalities of a GIS. As part of this identification process, the tourism practitioners from the KZN province were interviewed, primarily to validate the location of the adventure hotspots, but also to add valuable knowledge for the understanding of adventure hotpots. The second bjective was to conceptualise and then to illustrate how the information prompts relevant to adventure travel hotspots, as well as appropriate responsible behaviour, can be adapted for implementation in a mobile GIS environment.

In the following three sections (5.2 to 5.4), the research process is reviewed and the results and findings discussed. In Section 5.5, the potential value of the research is discussed. The data limitations of the research are discussed in Section 5.6. The chapter concludes with suggestions for further research (Section 5.7) and concluding remarks (Section 5.8).

5.2 Identification of adventure hotspots

To achieve the first objective of identifying adventure hotspots in KwaZulu-Natal, a vector grid (vectorised grid) approach was used to identify the relevant adventure hotspots. Numerous studies have shown the effectiveness of the vector grid approach in analysing geographic data (Beedasy, 1999; Xiao et al., 2002; Boers & Cotrell, 2005; Berry, 1995). For this research, an adventure hotspot was defined as an area that is remote, has the presence of traditional culture, is rich in natural resources, is in a wilderness area and is unspoilt, exotic, nature-based and undisturbed. Relevant spatial data pertaining to the natural and the human features were collected from a government agency, as well as a private industry company.

Spatial information from a hard copy map book was also geocoded. Although natural features dominate in the definition of an adventure hotspot, it also includes human elements. Thus spatial data were gathered for 15 natural features and four elements related to the human environment. These 19 features were prepared as separate data layers in a desktop GIS.

The data were grouped into two sets, namely natural and human phenomena. To accomplish the objective, a number of SQL queries were executed on the two data sets. A map was created by applying the methodology to the human data group. This action identified grid cells with zero (null) presence of human features. A map was also created from the methodology applied to the natural data group. This identified grid cells with a high presence of natural features. To achieve the first objective, the two maps were overlaid in order to locate areas with no human features and an abundance of natural features. These areas were saved as the potential hotspots.

The output was the identification of 259 grid cells (each measuring 25km²) that had no presence of human features and a rich variety of natural resources. These 259 cells were identified as possible adventure hotspots. This aligned to the research definition of an adventure hotspot which to reiterate, has a variety of natural features and zero (null) presence of human features.

After the initial identification of hotspots, practitioners involved in tourism in KZN were targeted by means of a questionnaire to validate the GIS methodology used to identify adventure hotspots, as well as to ascertain their perceptions of sustainable planning at the identified hotspots. Twelve tourism practitioners answered a questionnaire consisting of a mixture of quantitative and qualitative questions dealing with the GIS methodology that has been used to identify potential adventure hotspots. The questionnaire also aimed to ascertain perceptions regarding sustainable planning at the identified hotspots. After the first five interviews, two further phenomena, waterfalls and caves, were added as spatial layers to the GIS, and the overlaying as explained above was performed once again. This resulted in 263 grids cells (each cell representing an area of 25 km^2) being identified as potential hotspot areas.

The first five questionnaires were completed during face-to-face interviews, and the remaining seven were done telephonically. The primary purpose of the questionnaire survey was to use the expert knowledge of local tourism practitioners to evaluate the spatial patterns of hotspots identified. A combined satisfaction of 84% with the adopted GIS methodology was achieved. The KZN tourism practitioners interviewed made some thought-provoking comments on the methodology to identify the hotspots, as described above. One of the respondents noted that the vector grid approach was ideal as a starting point to get a good idea of the overall spatial distribution at provincial level. However, if there is a need to focus on a particular location or region, perhaps the ideal approach would be to work at a higher spatial resolution (smaller grid cells) or to use precise point mapping, using a vector-based methodology and analysis. Another important suggestion by the respondents was to include existing tourism attractions, such as World Heritage Sites, existing EKZN sites and other TKZN attractions, as phenomena in the GIS database. These phenomena (spatial layers in the GIS) will allow comparison between existing and emerging adventure hotspots in the GIS.

The tourism practitioners were asked to identify other spatial features that should be included as phenomena to identify hotspots. The full list was given in Table 3.11. The following locations were regarded as some of the more pertinent responses noted by the researcher: existing adventure hotspots; diving spots along the Indian Ocean; hiking trails, especially in the Drakensberg region; and all the private- and state-owned farms.

Each respondent was given a chance to comment on the spatial distribution of identified hotspots in their respective regions. There was an overall satisfaction of 86% with the hotspot map. It should, however, be noted that the majority of the respondents were concerned with the lack of hotspots identified in the Drakensberg region. It was suggested that the entire region be included as a hotspot, since it is a world-acclaimed heritage site.

The respondents were also requested to identify locations that they perceive as hotspots but that were not identified as such by the applied GIS methodology. The full list of ‘missed’ hotspots was provided in Table 3.12. The following locations were

regarded by the researcher as more important: the Valley of a Thousand Hills, the Ndwedwe mountain range and Red Desert near Port Edward. Similarly, the respondents were asked whether there were any hotspots truly new to them. The full list was provided in Table 3.13. The area around Vryheid was regarded by the researcher as more important.

5.3 Information on hotspots from tourism practitioners

Another purpose of the questionnaire survey was to gather knowledge from KZN tourism practitioners about adventure tourism hotspots in the province. An important outcome was the information gained from these practitioners regarding the traditional Zulu culture. The majority of the respondents noted that interacting with the traditional Zulus, especially in the remote areas, can definitely be considered as an adventure activity, especially for foreigners who will inevitably experience a degree of culture shock because of the difference between their own culture and that of the locals.

The survey also aimed to ascertain the practitioners' viewpoints on planning for sustainable tourism at identified hotspots. Firstly, the majority of respondents were of the opinion that involving a local community in planning and decision-making was a vital part of ensuring that tourism development is sustainable. Some of the responses were linked to the impact of external variables unique to the region, for instance, drug-trafficking (mostly Marijuana) between Lesotho and KZN. One respondent noted that development and planning of tourism regions in remote traditional cultural areas is difficult, since relationships between tribal chiefs are often fragile, as is reflected by the situation in the Mnweni Valley in the Drakensberg region. The most prominent impact is when locals quit their local way of life to work in tourism-related jobs. It is also highly probable that some hotspots are located in remote areas where no communities reside. Another comment was made on the importance of NEMA and its related acts. These acts have a significant impact on the management and planning concerns of developed and developing land in South Africa.

The questionnaire also sought to determine whether any of the respondents were interacting with the locals and where this interaction was taking place. Most

respondents indicated active participation in communities. A full list is given in Table 3.15. The most important locations identified by the researcher are the Dukuduku, Nkandla and Mbongweni regions.

A healthy working relationship between the tourism practitioners and the locals requires years of theoretical and practical knowledge on the decision makers' part. Furthermore, a sound understanding of the authorities' local traditions and customs is critically important if tourism development is going to be successful in the region. All respondents indicated that the best way to ensure a healthy relationship with the local region is to have a series of one-on-one interviews with the locals at the identified hotspots. Experiences from past interaction with locals suggest that each area and community is unique in their needs and offerings. Examples that were given include the Dukuduku Forest communities near St Lucia and the Sani trans-frontier mountain region where neighbouring communities are in opposition to tourism development. This conflict between local tribes will inevitably cause complications with development roll-out plans.

Since adventure is a relatively new type of tourism, definitions vary from researcher to researcher. Definitions seem to distinguish between the hard and soft categories of adventure tourism (refer to Section 2.2.3). This study therefore aimed to formulate a unique definition for 'adventure' in the KZN context. The respondents were asked to state a few key words relating to 'adventure' in KZN. From the list (see Table 3.17), the research proposes the following definition which can be used in a KZN marketing campaign or for a unique definition of adventure tourism destinations in the KZN context: adventure tourism in KZN, "*where you will undoubtedly be physically challenged and wowed by the pristine remote destinations found throughout the province. Expect the unexpected, prepare for an adrenalin-filled intrepid experience in the depths of remote KZN, prepare for action and danger, but most of all, enjoy the adventure; it is sure to be a once in a lifetime treat!"*

The questionnaire survey also focused on mobile technology use in sustainable tourism planning. The respondents were asked about the potential of using mobile technology as a tool to communicate and induce responsible tourism behaviour.

Only four respondents noted that a mobile GIS can be used as a potential tool to educate the traveller about responsible behaviour at the destination. The other respondents suggested various other strategies, media and tools that could be used to educate the adventure traveller. A full list is given in Table 3.18. The most important suggestions identified are signage along the road to the destination and in conservation areas, more research into the nature of the traveller, using e-mail and social networks and education of locals by means of well-conceptualised workshops. The list above highlights the number of different factors to consider when planning a successful campaign to educate and ensure that the adventurer is a responsible traveller in KZN.

The researcher enquired from the respondents whether a mobile GIS can work as a tool to educate the adventurer about unique and fragile resources. Seven of the respondents strongly agreed and five respondents agreed. The respondents made some important comments. The adventurer could, in all probability, be a young, dynamic and technologically proficient individual with a desire to use a mobile device during the adventure experience. In contrast, it could also be an older, more mature adventurer who would ideally not want to use technology during his/her travels. The nature and timing of the information is vital to strike a balance between the over-use of technology and the under-use of it. The main reason for the adventurer to want to partake in an adventure is to escape the mundane routine of their day-to-day life, which may involve the use of technological devices. Another important conclusion is the reality of poor network coverage in some of the more remote hotspots. The functionality setting of the mobile GIS should have the ability to ‘know’ where the regions of low or no coverage are.

The respondents’ viewpoints on the development of a mobile GIS application were also ascertained. The respondents were asked whether a mobile GIS should be developed by government, industry or as a joint venture. As expected, all respondents suggested a joint venture by government and industry. Some valuable insights were gained as a result of this particular question. Respondents suggested that the country’s leading cellular providers (Cell C, MTN and Vodacom) should work in synergy with TKZN. The information should be stored and managed by the TKZN

authorities, and emphasis should be placed on the accuracy of the data content. There was common consensus that many 21st century travellers will be adapting to mobile technology during their travels. It is up to the tourism practitioners to manage this evolution of the use of technology in a constructive and creative manner to ensure that all involved stakeholders benefit from the technology.

5.4 Implementation in mobile GIS

Objective 2 had two components. The first component was to establish information prompts relevant to adventure activity in KZN. The second component was to conceptualise and illustrate how information prompts relevant to adventure travel hotspots can be adapted for eventual implementation in a mobile GIS environment.

Guidelines provided by Jamieson (2006) included aspects such as: what are the resources, theme and sub-theme to be interpreted; who are the visitors; how and where will the information be delivered to the visitors; and the cost of providing the service and how the service can be evaluated. The following is a brief summary of the collation of information into categorised tables.

Category 1: contact numbers or contact websites, WWW information on associations and other useful information.

The adventure activities recognised by the TKZN authority were used as the basis for the content of category 1. Although Internet searches provided useful additional information for this category, there were some activities for which data was not readily available using basic Internet searches.

Category 2: safety of the adventurer

The researcher's personal travel observations and information from existing TKZN hard copy material on adventure tourism, the Global Code of Ethics from the WTO, and the national responsible tourism guidelines (DEAT, 2002), were adapted to form the content of category 2 information prompts. The information prompts were related to the following topics: arrival at the airport, passing through built-up areas, hiring a taxi to an accommodation point, sleeping and waking up in KZN and hiring a car in KZN. Spatial layers from the GIS that were used were built-up areas, identified adventure hotspots, KZN streets network and accommodation points. Another layer

to be considered for inclusion is the TKZN Shot'Left signboards (as referred to in Section 4.2.3).

Category 3: responsible treatment of the traditional cultural environment
Topics adapted from existing TKZN sources were: speaking the local language, greetings and fitting in, locals' perception of tourism, games, songs, local food and drinks. These topics relate to the 'tribal authority' spatial layer in the GIS. In a real-life mobile GIS environment, if the location of the device falls in or in proximity to the tribal authority layer, the information prompts can be sent to the adventurer's device. The sources used to create these information prompts include: national responsible tourism guidelines (DEAT, 2002), isiZulu to English online dictionary (IsiZulu, 2010), SA slang words (New Fusion Travel Safari and Accommodation, 2009), Zulu traditions and culture (Library Think-quest, 2009; Spenceley, 2008), Zulu games, song and dance (Can Teach, 2009a, 2009b) and traditional Zulu stories (UKZN Literary Tourism, 2009).

Category 4: responsible treatment of the pristine natural environment
Responsible behaviour in the natural environment is arguably the most important category, given the adventurer's natural inclination to want to experience the natural outdoors. Topics addressed in this category were divided, according to the TKZN categories (see Appendix 7), into three broad categories, namely on the land, in the water and in the air. These topics relate to the following layers in the GIS: wetlands, perennial water bodies, river, fauna and flora, geological areas of importance, sandy beaches, rocky beaches, pebble beaches, low and high mountains, national heritage sites, conservation areas, waterfalls and caves. Sources used to create the information prompts are: Global Code of Ethics (Global Code of Ethics, 2008); Intrepid Travel® responsible tips (Intrepid Travel, 2011); Spenceley (2008); Maloti Drakensberg experience (Cornhill et al., 2007) and Ezemvelo KZN Wildlife(2009 a, b); TKZN Responsible Tourism brochures (TKZN, 2009a & 2009b) and personal observations from travel experiences.

With regard to the first component of the second research objective, it is important to mention that the prompts were created with the adventurer in mind. The messages are kept as short as possible to ensure that the content can be sent in short and

simple SMS format. This format is arguably one of the least technically challenging methods to deliver content to the mobile device. Also, it is important to mention that these information prompts are just examples and will, in a real-life application, need a more focused data collection and analytical process conducted in cooperation with experts from the KZN tourism sector.

The second component of the second research objective was to conceptualise the framework criteria for a mobile GIS in the KZN province. The characteristics of the typical adventurer were linked to theoretical models such as the TAMM (Kassinen, in Lumsden, 2008:102-118) and HCI guidelines (in Grun, 2005:49-50). Relevant mobile applications and other relevant applicable WWW sources were used to link both the guidelines and adventure characteristics (see Table 4.8 for a summary of the method). The results are a set of seven criteria that will be discussed in the paragraphs that follow.

Criterion 1: the adventurer is a knowledgeable, dynamic traveller

A personal profile of the adventurer can be created to streamline the information flow to the mobile GIS. A set of steps are described below, discussing how this framework criterion can be achieved in the mobile GIS.

Step 1: the adventurer can be given the option to create a personal profile describing the proposed adventure route and preferences. Figure 5.1 illustrates the proposed steps (see numbers 1, 2 and 3 in the figure). This step can filter the personal profiled information. The main profile categories are (as denoted by the number ‘1’ in Figure 5.1): age, country of origin, start (origin) of trip, end (destination) of trip and duration (as denoted by the number ‘1’ in Figure 5.1). Step 2 drills deeper into the personal profile of the traveller. Numbers 2 and 3 in Figure 5.1 illustrate the ‘deeper’ personal profile step. A typical scenario is shown in Figure 5.2, highlighting an adventurer who is keen to experience a ‘climbing’ activity. One of the implications of the personal profile creation is that the functionality setting of the mobile GIS can be programmed to calculate the origin and destination point of the proposed journey. Figure 5.3 illustrates the path by means of an arrowed line, starting in Durban and ending in Pietermaritzburg. The mobile GIS functionalities can also be set up to create a type of buffer, or geo-fence, around the path of the journey, from origin to destination.

Figure 5.4 illustrates this by means of a rectangular block around the start (origin) and end (destination) points. The functionalities (of the mobile GIS) can also, because of the profile choice of ‘climbing’, link the adventure activity to the information prompts that has ‘climbing’ as a key identifier. In this instance, embedded SQL queries can link the activity of climbing to the spatial layer ‘high mountains’. A possible scenario of an information prompt that can be SMSed to an adventurer when in proximity to or in a high mountainous area (as illustrated by the layer ‘mountains high’ in Figure 5.4), is illustrated in Table 5.3 (an extract from the more detailed Table 4.5 (a)).

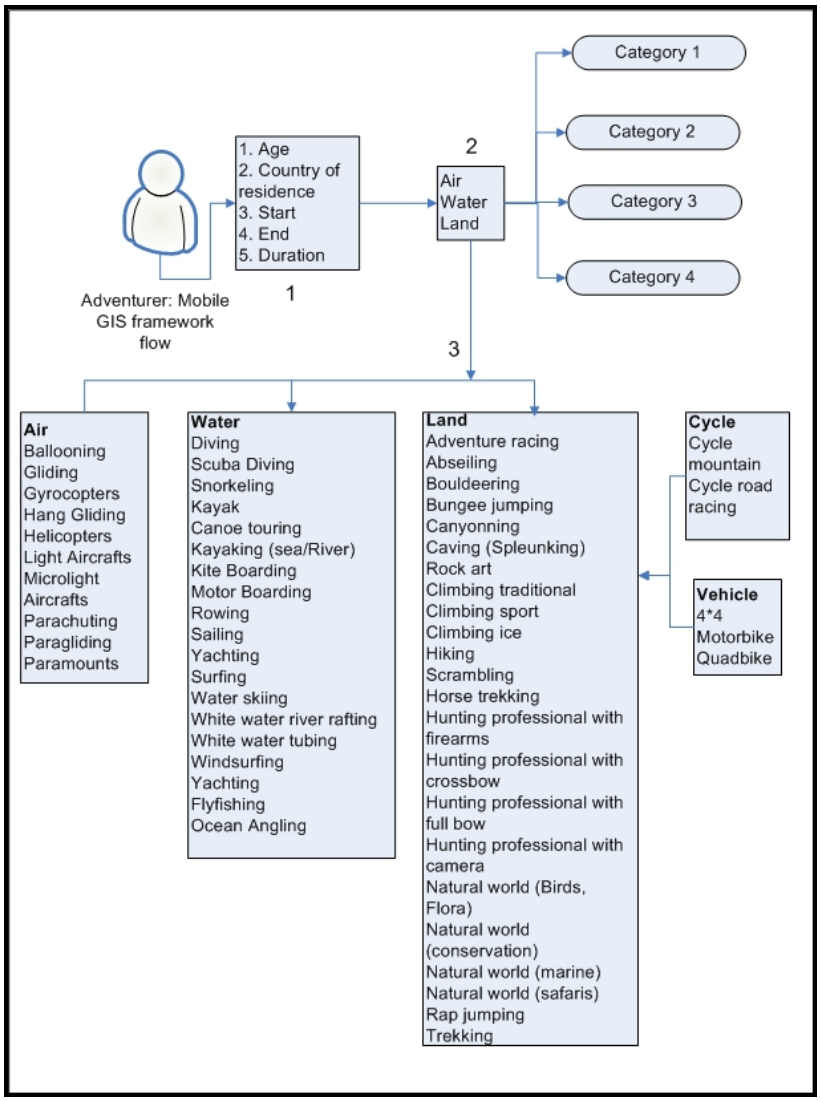

Figure 5.1: Framework for criterion 1 — creation of personal profile for adventurer

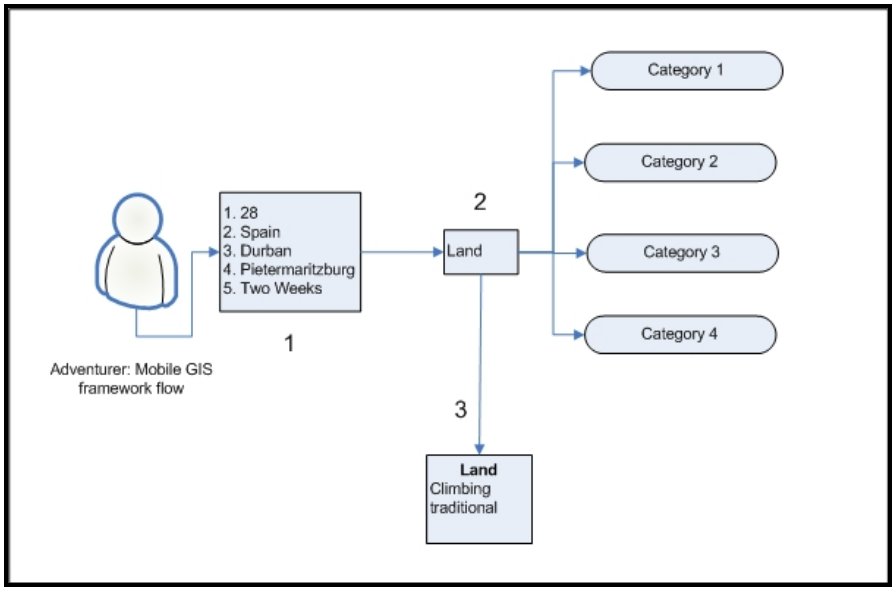

Figure 5.2: Framework for criterion 1 — climbing activity scenario

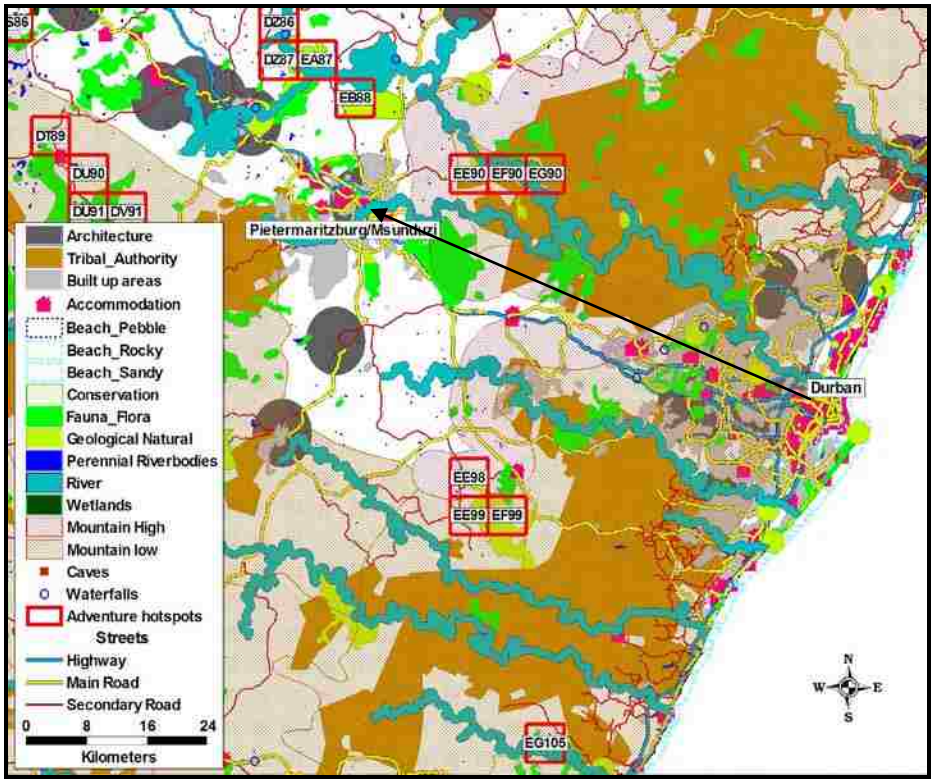

Figure 5.3: Framework for criterion 1 —climbing activity scenario

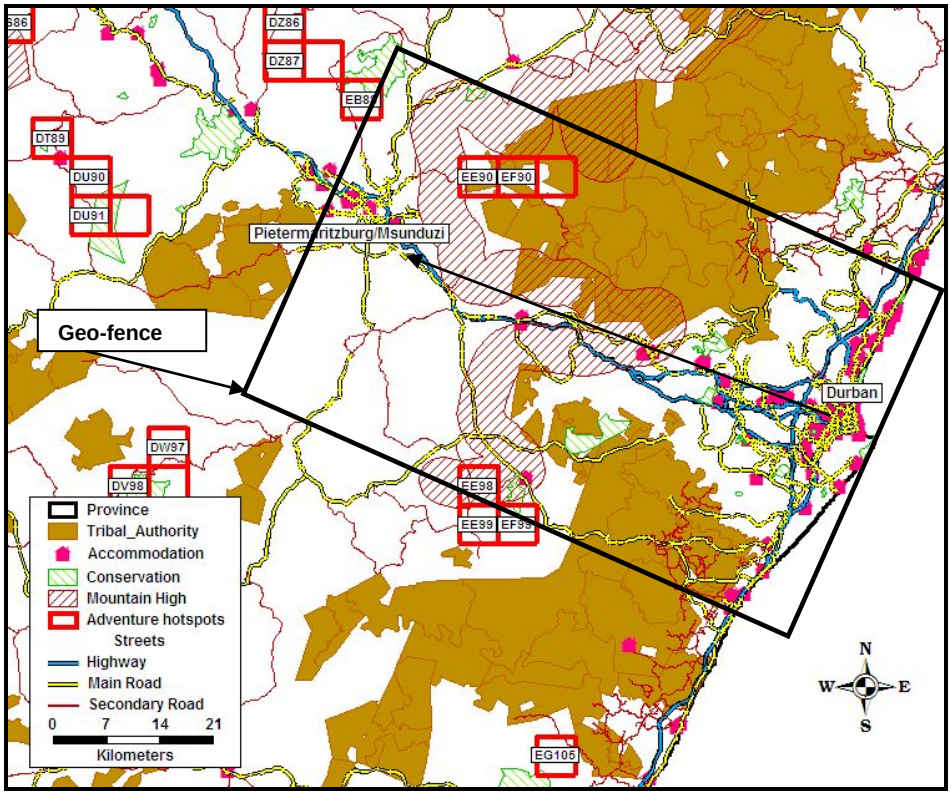

Figure 5.4: Framework criterion 1 — climbing activity scenario with geo-fence

Criterion 2: the adventurer wants to experience a venture filled with elements of spontaneity.

A typical scenario in a mobile GIS environment could be as follows: the adventurer completes the profile requirements. In this scenario, it is a 28-year old from Spain who intends driving from Durban to Umzimkulu (illustrated in Figure 5.4). The adventurer is expected to be in KZN for one week and is interested in water activities such as rafting and canoeing. The adventurer begins to traverse the KZN towards the proposed adventure activity (see the black arrowed line in Figure 5.6). The functionality setting of the mobile application 'knows' that the adventurer is passing through a built-up area in which there are more general tourist attractions (see the black circle in Figure 5.6 close to Port Shepstone). In this scenario, a possibility is that the visitation numbers of the attraction has recently shown a steady decrease. This would, in all probability, have a negative impact on the tourism earnings of the region. As part of the TKZN strategy (in this scenario) it would be ideal if tourists, as well as adventure travellers, can be enticed to visit the area before heading off into the remote to partake in their adventure activity. These tourists and adventurers

would most likely spend money in the region, which would increase the earnings of the region and thus sustain the existing tourism-related business. An approach similar to that of the Foursquare model can possibly be used to entice businesses to attract passing adventurers. These passing adventurers can help to increase the visitation numbers at a declining tourist attraction. A message can be sent to the adventurers' mobile device, suggesting an opportunity to receive a half-price meal at a local pub, on condition that the adventurer deciphers the QR code at a local monument. The QR code can be stuck on a physical monument that has traditional cultural value. This code can be deciphered by the users' mobile device. The technology requires that the individual would need to take a picture of the actual QR code. Built-in technology on the mobile device will decipher the details of the code. The QR code can provide information about the history of the monument, as well as directions to the local pub where the discount meal can be claimed. If the adventurer decides to change his/her path, he/she does so spontaneously, which aligns to this framework criterion.

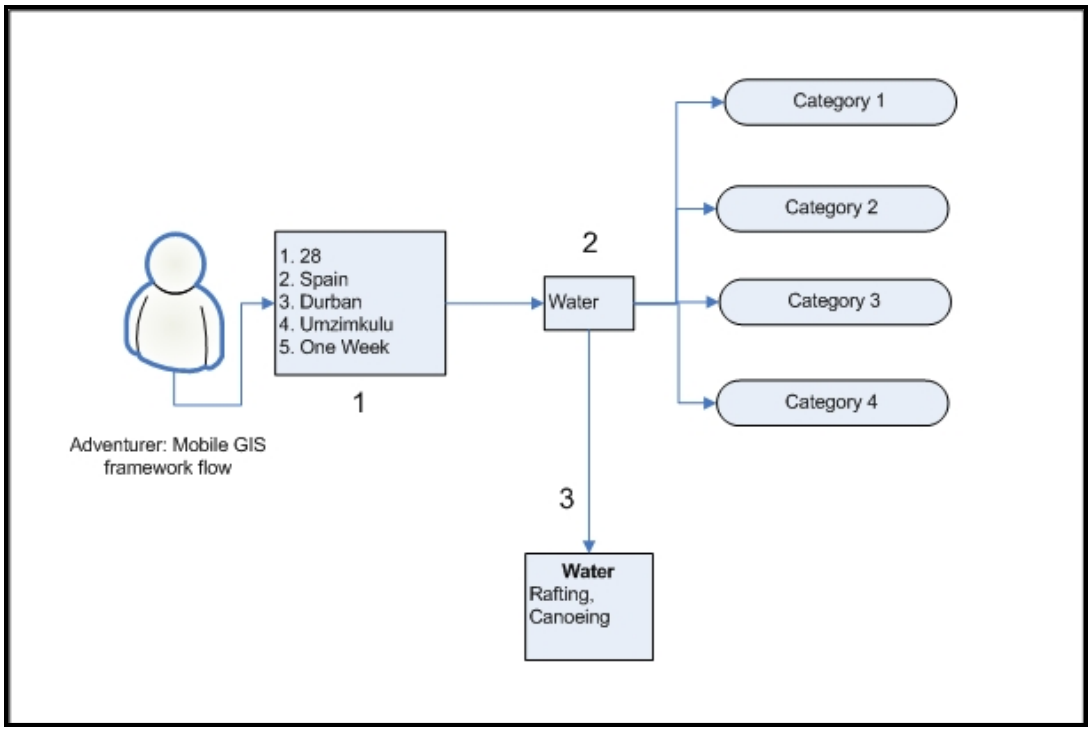

Figure 5.5: Framework for criterion 2 — profile creation for the adventurer

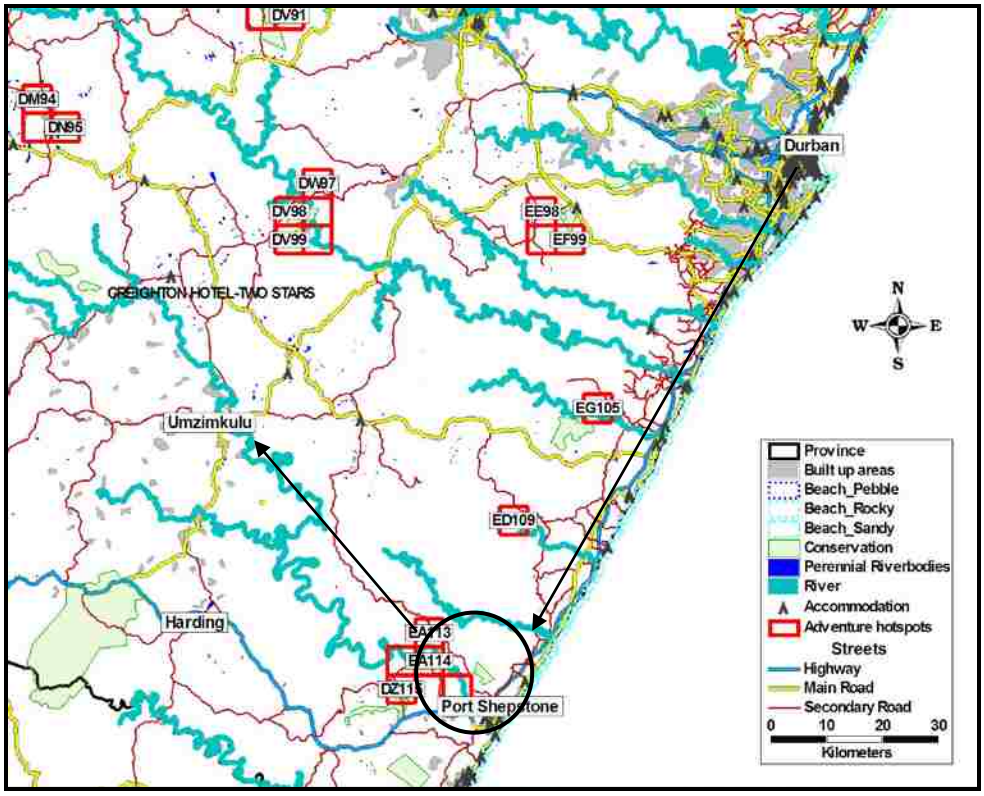

Figure 5.6: Framework criterion 2 — scenario of water-related activity

Criterion 3: the adventurer is most likely to experience a degree of culture shock when interacting with locals from remote destinations

The application, Digital Dowsing rod (DIWI), proposes a framework for the individual to learn about the local culture and traditions (Goosen, et al., in Gretzel et al, 2010: 111). Another novel mobile application that was reviewed is the 'Time-Treks' model. This approach adopts a storyline as a medium to educate the traveller. In the KZN context, interpretive stories can be formulated around the local history and culture (UKZN Literary Tourism, 2009). Since cultural stories originate in a place, the story can be linked to a precise location. When the adventurer is in the proximity of the location, telling of the story is triggered in the form of an SMS to the adventurer's mobile device.

The adventurer creates a profile (refer to the previous profile - Figure 5.5), which is a scenario for an adventurer travelling from Durban to Umzimkulu. The black arrowed lines in Figure 5.7 illustrate the path that will be captured in the GIS while the adventurer is travelling from origin to destination. The functionality of the mobile GIS

can be set to activate the tribal authority layer, since it is in these regions where the adventurer is likely to interact with the local Zulus.

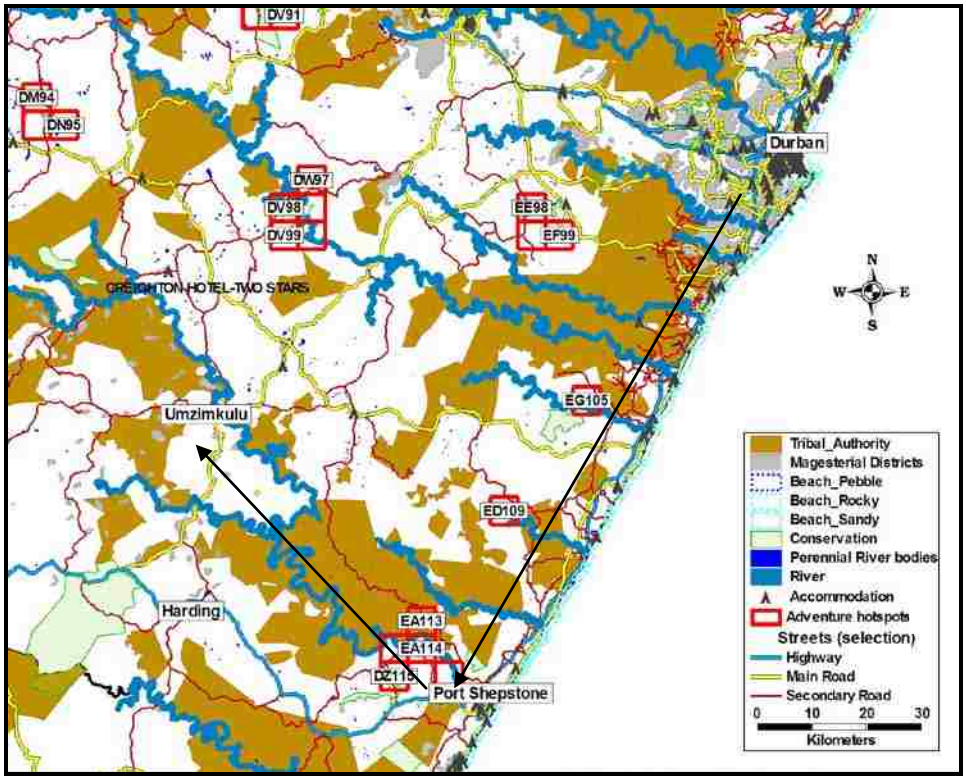

Figure 5.7: Framework criterion 3 — an adventurer's path through tribal authority land

The functionality setting of the mobile GIS can be programmed with SQL queries that can deliver information prompts to the device. In this scenario, the information prompts from category 3 are relevant — see Table 4.4 (a) to (e). The probability is that the adventurer would have read about the traditional Zulu mannerisms and traditional ways of life during his/her pre-trip planning phase. If these information prompts are sent when in or close to the traditional cultural region, a possibility is to deliver the content to the device to remind the adventurer on 'how to interact' with the locals when actually in the region.

Criterion 4: the adventurer is not dependent on technology but is, in all probability, technically proficient

The comments of the respondents with regard to the functionalities of the mobile GIS should be considered here. The tourism practitioners suggest that the mobile application be unobtrusive, not interfering too much with the adventurer's desire to soak up the natural beauty of the surroundings. The reality to consider is that the

adventurer is keen to experience the great outdoors and would not want to be between soaking up the natural wonders at the adventure destination and the use of a technological device is not an easy task. The research proposes to use the adventure hotspots as the benchmark layer. The functionalities of the mobile GIS can be set to turn the mobile application to ‘unobtrusive’ mode when in or in the proximity of an adventure hotspot.

A typical scenario for this framework criterion in a mobile GIS environment is elaborated on below. The adventurer creates a profile suggesting a journey from Ballito to Eshowe (see the black arrowed lines in Figure 5.8). As soon as the adventurer is close to the destination in Eshowe, the functionality setting of the mobile GIS registers that the traveller is close to his/her destination. The mobile device assumes ‘unobtrusive’ mode. Research by Campbell & Tarasewich (in Brewster & Dunlop, 2004) suggests using a combination of coloured LED lights that informs the adventurer of the type of incoming information. The adventurer is made aware in advance of the meaning of each colour. For example, a green light could mean the adventurer is not located in a remote and pristine hotspot location. An orange light could mean the adventurer is nearing a remote pristine hotspot - this could be as the traveller nears Eshowe. A red light could mean the adventurer is in or in close proximity to a remote pristine hotspot. The black line ending in a circle (as represented in Figure 5.8) illustrates the path that will be captured in the mobile GIS while the adventurer is travelling between his/her points of origin and destination. The information prompts embedded in the database and linked to the hotspot can potentially educate the adventurer about the natural and traditional environment by delivering a message to the mobile device. The attributes highlighted in yellow (see Table 5.1) are the attributes that contributed to the area being identified as a hotspot. These attributes can assist people from TKZN who are tasked with developing informative content related to this hotspot.

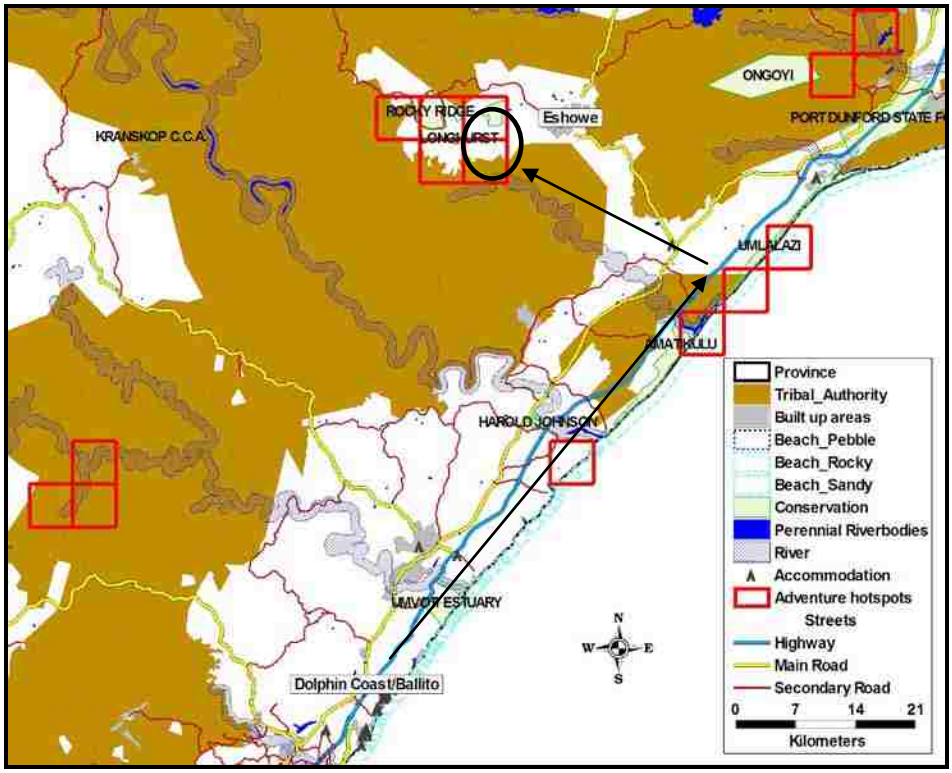

Figure 5.8: Framework criterion 4 — an adventure's path from Balito to Eshowe

Table 5.1: Framework criterion 2 — attributes of highlighted hotspot

Attribute name	Count per grid cell
Built-up areas	0
Streets	0
Architecture	0
Accommodation	0
Wetlands	0
Conservation	3
Fauna and flora	6
Geological	3
Rivers	0
Rocky beaches	0

Attribute name	Count per grid cell
Sandy beaches	0
Pebble beaches	0
High mountains	0
Low mountains	1
Perennial water bodies	0
Natural heritage sites	3
Waterfalls	0
Caves	0

Criterion 5: the adventurer is eager to experience a risky situation (need for an adrenalin rush) during his/her adventure

This framework criterion suggests using a geo-treasure hunt approach similar to that of the Geo-caching model (GeoCaching, 2010). A probable scenario in the mobile GIS environment is elaborated on here. The adventurer's profile suggests that the traveller will be visiting the Kamberg Conservation Park (see label '5.9.A' in Figure 5.9). Suppose a geo-treasure has been 'hidden' by the local conservation officer.

Geo-treasure hunting can possibly teach the adventurer something unique about the fragile natural and vulnerable traditional cultural environment. The ‘treasure’ could be discovering a rare rock formation, or perhaps a local heritage folk story. Figure 5.10 illustrates is a possible scenario that can perhaps teach the adventurer something about the traditional cultural context.

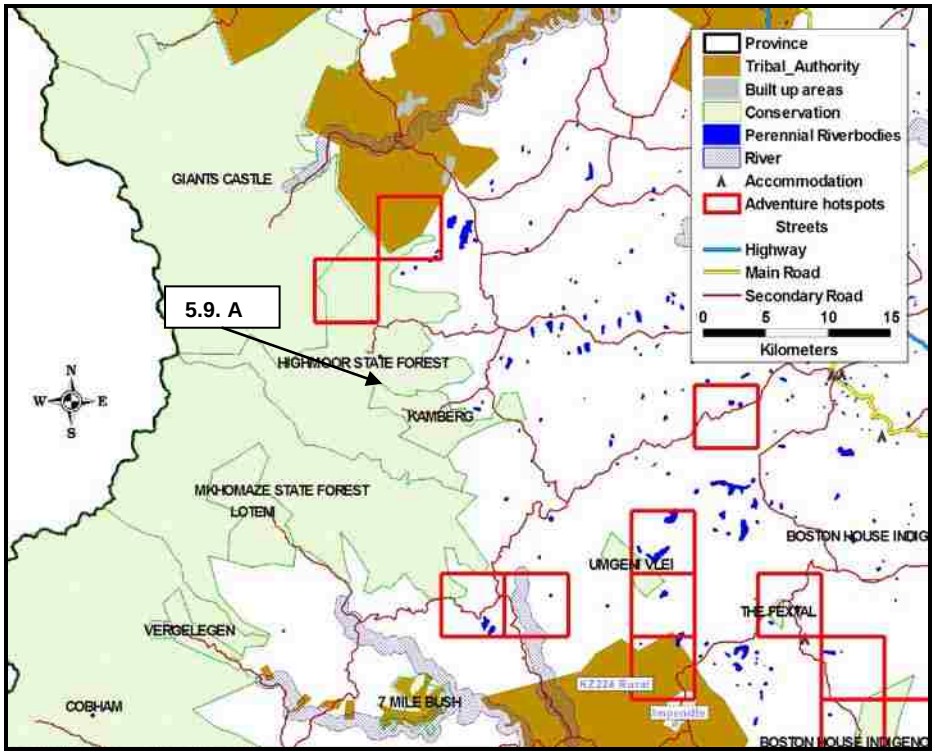

Figure 5.9: Framework criterion 5 — an adventure activity at Kamberg

Hard copy maps can also be integrated into this framework criterion. “Paper maps are portable, cheap, foldable, need no electric power, can be shared in groups and can be annotated easily by various forms of markers” (Grun, 2005:18). Grun (2005) further suggests that a special digital pen can serve as a medium to locate the position of the user and to send the location to the mobile GIS. The functionalities of the mobile GIS can also be set up to print a route map for the adventurer, according to his/her profile, and the smart phone can be modified to perform the role of a digital pen. Locations of geo-treasures can also be included on the map, together with other useful TKZN information. The ability of the GIS to print route maps is important, as hard copy maps are still highly regarded as ‘must haves’ for any tourist. Printed maps are still considered a valuable source of information that can be used to find

places and prevent the traveller from getting lost or ending up in a precarious situation.

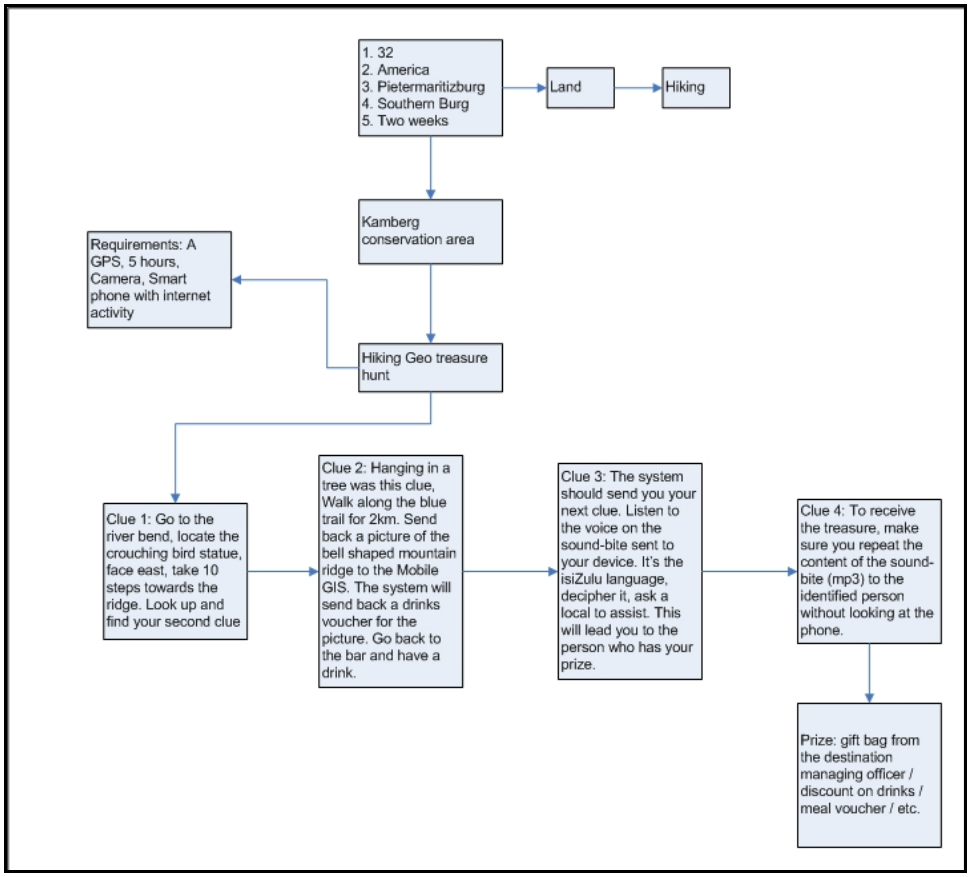

Figure 5.10: Framework criterion 5 — example of geo-treasure hunt

Criterion 6: the adventurer is likely to venture off the beaten track into the remote

The functionality settings of the mobile GIS identifies that the adventurer is entering a 'high mountain' region that was pre-identified as a region with low network coverage. The arrows (see Figure 5.11) highlight the path of the traveller from origin to destination. The functionality of the mobile GIS framework can be set up to draw a buffer around the 'high mountains' spatial layer (illustrated by the purple line in Figure 5.12). This buffer layer can be used to trigger the delivery of information prompts relating to the 'high mountain' feature as soon as the traveller enters the buffer zone. This would effectively mean that the information prompts can now be sent to the adventurer before he/she enters the region of low network coverage. Another option is that the information prompts can be downloaded to the mobile device so that the user can access the information even when he/she is in an area

with no network coverage. For this criterion to work effectively in a real-life environment, the ‘high mountain’ layer must also be merged with a network coverage layer that locates those network regions with low to no coverage.

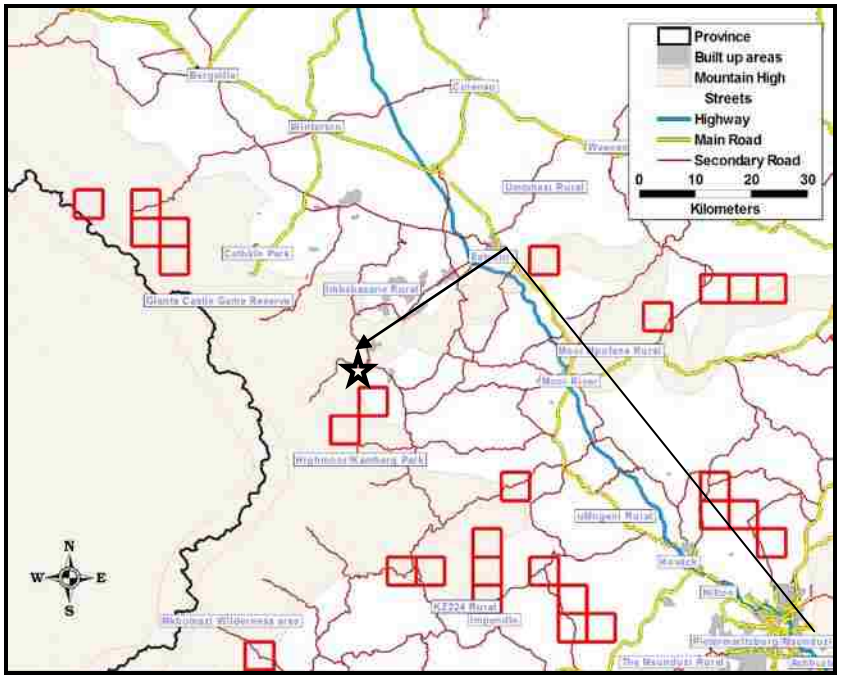

Figure 5.11: Framework criterion 6 —an adventure path to activity at Highmoor Kamberg Park

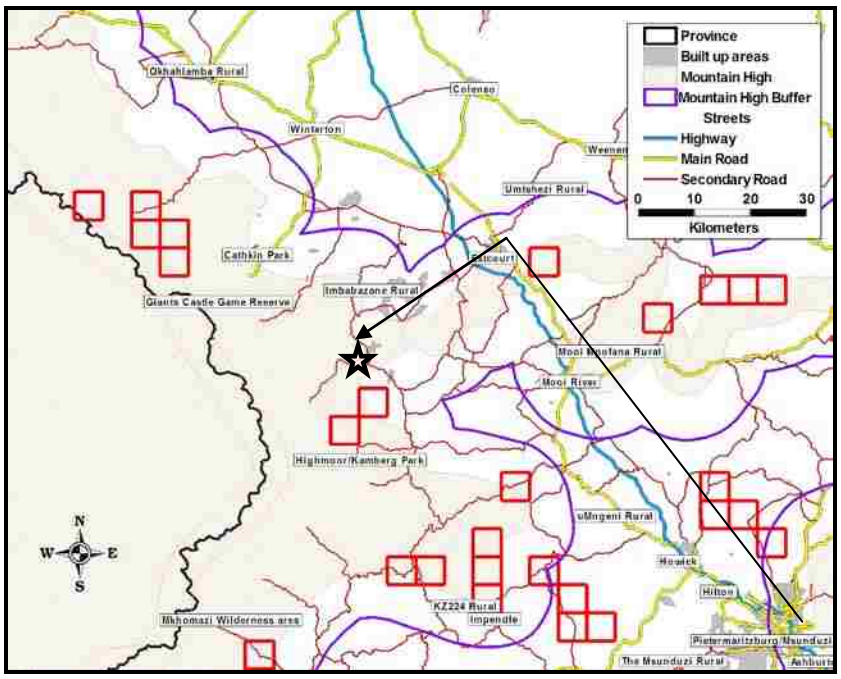

Figure 5.12: Framework criterion 6 —an adventure path to activity at Highmoor Kamberg Park with buffer layer

Criterion 7: adventurers can often end up in areas where their safety is at risk

A probable scenario is explained in the following two paragraphs. The adventurer creates a profile similar to that in framework criterion 1 (shown in Figure 5.13). The mobile GIS functionality is set to recognise the origin (start) and destination (end) of the journey (as noted by 'B' in Figure 5.13). While travelling between the origin and destination, the location of the traveller can trigger the sending of information about traditional climbing to his/her device. Such information can be extracted from any spatial layer that is linked with the activity of 'climbing traditional'. An example is the layer showing accommodation points (as noted by 'A' in the Figure 5.13 below). Accommodation points might offer services such as guided hikes and rental of climbing equipment. Such information will be embedded (as 'climbing traditional') in the alphanumeric attribute table of the accommodation layer. The sending of the information will be triggered as soon as the traveller reaches a predetermined distance from the accommodation point.

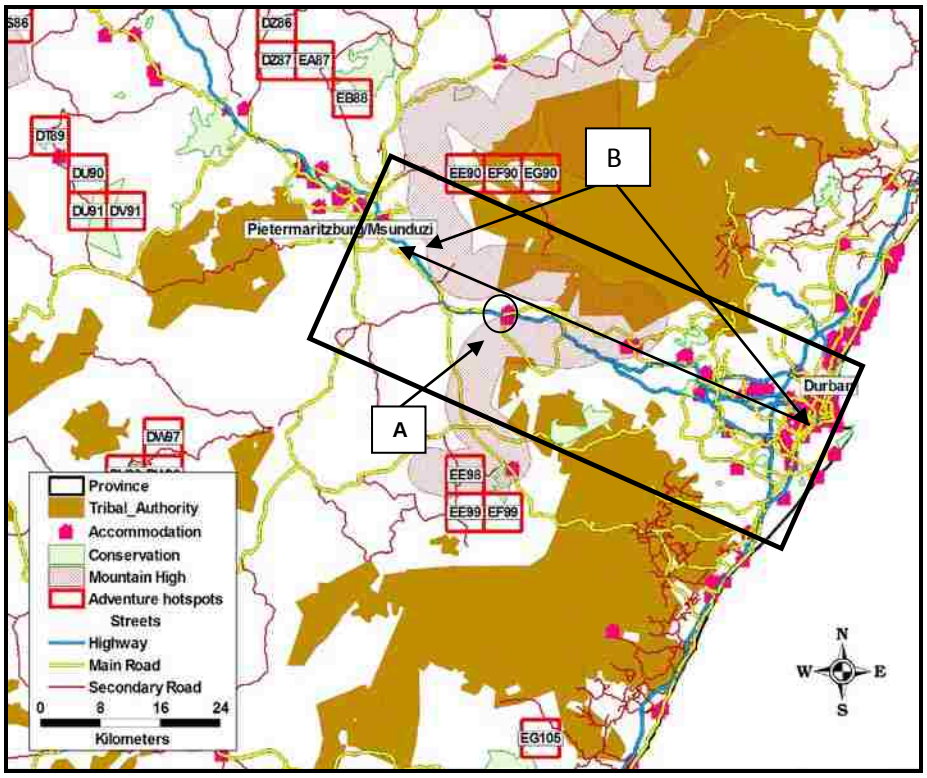

Figure 5.13: Framework criterion 7 — a climbing activity scenario linked to safety of adventurer

Another relevant scenario is the ‘high mountain’ feature that the adventurer will pass along the journey. Being aware of the important information related to climbing activities can be essential to prevent a climbing-related accident. As the traveller enters a high mountain region, the information related to category 1 (see Table 5.2 for the nature of the information) can be sent to the travellers’ mobile device. Table 5.3 is an example of category 4 information prompts related to the natural pristine environment that can be sent to the adventurer.

Table 5.2: Framework criteria 7 — link to category 1 information prompts

Land adventures	**Contact numbers or contact websites**
Caving (spelunking) and rock art	Protecting rock art - KZN, contact Amafa - 0333946543. uKhahlamba Drakensberg Park World Heritage Site UDPWHS – 0332391508
Climbing traditional	http://www.climb.co.za/directory.asp
Climbing sport	http://www.climb.co.za/directory.asp
Climbing ice	http://www.climb.co.za/directory.asp

Table 5.3: Framework criteria 7 — ‘climbing traditional’ links to ‘High and low mountains’ in information prompts of category 4

Category	**Related spatial feature**	**Message**	**Source**
On land	High and low mountains	Abseiling and rock climbing is extremely popular. Find out if your tour provider has the necessary qualifications and check all your equipment. Erosion is most likely to occur in hotspot areas that are suitable for climbing activities. If you spot an area that is highly eroded and is still being recommended for use by the tour operator, it is probably best to report the situation to the tourism authority.	Personal observations

According to Moscardo (1999), an effective message should consist of a mixture of media, novel scenarios of conflict and surprise, use of questions and good physical orientation. A mobile GIS was suggested as a tool to deliver information to the adventurer travelling KZN. All framework criteria were discussed and explained in a spatial context as hypothetical scenarios.

In a real-life application, the mobile GIS would be required to have an online mapping platform. It is beyond the scope of this research to analyse the best platform. From the TKZN perspective, their choice of using Google Earth and Google Maps as their website mapping platform makes it plausible to suggest using the

Google Android mobile platform. Such a platform should provide easy merging with the existing TKZN Google Earth platform.

5.5 Potential value of the research

The results obtained from this research provided a better understanding of adventure tourism. Although the study was contextualised for the KZN environment it has potential to be useful on a universal scale.

The first objective was to accurately identify the location of adventure hotspots in KZN and to validate the findings by means of a questionnaire survey conducted among tourism practitioners from the KZN province. In general, the respondents were satisfied with the location of hotspots identified in the research. They also agreed that knowing where the hotspots are and what the hotspot comprise can help them planning and developing adventure tourism in the province.

The GIS methodology can be extended to include other layers such as crime hotspots, existing tourism locations, restaurants, nightlife hotspots and demographics. Many other tourism-related scenarios can thus be analysed using GIS functionalities. Suppose that a tourism decision maker undertakes community development programmes at locations in proximity to a hotspot. The GIS will provide a good overview of the location and distribution of features in the area. If the tourism decision-maker wants to initiate tourism development at a hotspot location, it would now be possible to clearly see the prominent spatial features. For instance, if there are perennial rivers and high mountains in the area, it would be likely that river rafting is a possible adventure activity at the hotspot.

In relation to sustainable planning at hotspots, it was concluded that involving the locals is essential. This can be easier said than done, as dealing with the local Zulu chiefs was identified as very challenging. They are often extremely traditional in their way of life. Working with the locals therefore requires a person who understands the Zulu culture and who earned the trust of the locals. Furthermore, such a person should preferably have a track record of successful community engagement projects.

The second objective was to conceptualise and illustrate how relevant information about adventure travel can be adapted for eventual implementation in a mobile GIS environment. The advent of mobile technology and GIS has been steadily growing over the last few decades. Companies such as Geoguides have already begun initiating pilot projects in KZN in relation to a mobile GIS for the tourist (GeoGuides 2012). The research has gone some way towards enhancing the understanding of how to create location-based responsible information content for a mobile GIS environment — especially in relation to adventure tourism. The following steps are proposed to create information prompts:

1. adoption of guidelines on how to think about meaningful information campaigns for the tourist (Jamieson, 2006);
2. collection of a mixture of hard copy and soft copy material related to adventure tourism (as discussed in Section 4.2.2;
3. the linking of spatial features in the GIS with the characteristics of different adventure activities;
4. summarising the content sourced from the soft and hard copy sources in short, insightful information prompts in appropriate categories; and
5. creating a link between the categorised tables of information prompts and spatial features in the GIS.

The five steps proposed provide a more strategic direction for content creation that could appeal to an adventurer in a mobile GIS environment.

The research has gone some lengths to provide decision makers with the basis for implementing a mobile GIS framework that could potentially suit the adventurer. While the research did not actually design a real-life working mobile GIS, it provides a step-by-step guide on how to go from understanding the adventurer to dealing with theoretical guidelines and with the relation to existing mobile applications. The questionnaire response with regard to the section on mobile GIS enhanced the understanding of what would ideally work in the KZN context. Relevant concerns related to the unobtrusive nature of the application, lack of network coverage in remote pristine hotspots, the safety of the adventurer, as well as the fun aspect of the application, were raised. The framework criterion adds substantial insight into the

understanding of what currently works and how this knowledge can be adapted for the KZN context

5.6 Data limitations

The most important limitation in this research was the lack of literature relating to adventure tourism - especially adventure tourism in developing countries.

The fact that the ENPAT data set dates back to 2001, does not impact too much on natural phenomena, but human aspects could have changed in this period. A few other data sets were difficult to source. These were the spatial distribution of state-owned and privately owned farms, dive sites and existing adventure activity destinations.

With regard to the questionnaire survey conducted among KZN tourist practitioners, it was an initial concern that the 12 respondents would not be a sufficient sample to achieve a valuable response. However, this was not the case, as the TKZN senior Information Systems Manager allowed the researcher to interview the most senior tourism manager from each region.

There were also concerns about data relating to the collation of information prompts for the adventurer traveller. There was an abundance of online sources related to responsible tourism. However, only a few sources are directed at adventure tourism. The TKZN adventure guidebook only discusses the locations of adventure tourism suppliers, with a short description of the region. Another limitation was the lack of comprehensive information about category 1 information prompts (see Table 4.2) available through basic Internet searches.

With regard to the framework criterion for a mobile GIS, a few limitations were noted. Spatial information about areas with low network coverage was not readily available. This information is required to prompt the adventure traveller about where he/she would be without network coverage. Another limitation identified in this research is that the majority of the reviewed mobile applications had their origins in developed countries. The situation in South Africa and more so in the remote pristine hotspots of KZN, is in stark contrast to the natural and traditional cultural environments found

in developed countries. Lastly, all the theoretical guidelines adopted for the research were based on empirical studies that also originated in the developed countries. This does not mean that the guidelines are not valid - it suggests that the guidelines should be cautiously used.

5.7 Recommendations for further studies

An insight gained from the literature, as well as from personal observations, is that mobile technology is advancing at an astonishing pace. Adventure tourism has also been identified as the fastest growing sector in tourism. With these noted trends, it is appropriate to state that further research is indeed required in all aspects related to the fields covered in this research. Not only is exploratory research required in all aspects of the sector, researchers should also make concerted efforts to keep abreast of the latest developments, since a few years' lack of research can lead to misinformation and poor decision-making.

With regard to the identification of adventure hotspots, future research might explore using grid cells of higher resolution and/or more detailed mapping by applying a pure vector approach. It should also be considered to include the layers identified by respondents as layers that could have enhanced the hotspot identification. These layers are listed in Table 3.11.

Future research should aim to distinguish between emerging and existing adventure hotspots. It would also be worthwhile to experiment with Multi-criteria Evaluation (MCE) by weighing the importance of layers used in the identification of hotspots. For such an approach, expert opinion is required to reach consensus on the weights to be allocated to the different spatial layers

It would be valuable to also investigate whether or not the locals are using the natural features at the identified hotspots. The locals could be using the natural resources to sustain there living requirements. An example: rivers can be fished to feed families, or the locals could have been insightful enough to open up (at a fee) fishing spots for passing tourists.

With the growing trend of foreign travellers wanting to interact with the traditional Zulus in the remote areas, a more focused type of cultural adventure tourism can be

created with the Zulus in mind. Existing areas of traditional culture, such as the Mnweni region in the Drakensberg and villages around the St Lucia Wetland Park, are good examples of where the locals play a key role in delivering tourism services to travellers (including adventure travellers).

Considerable work needs to be done to build more of a collaborative relationship between EKZNW, TKZN and other tourism stakeholders. It is perceived that a GIS Intranet portal could be useful. Collaborators should be able to view, query, print and manage information related to their hotspot of interests. Online discussion forums and online group assessments, adopting the MCE and Delphi techniques, could also contribute to a better understanding of the dynamics of an adventure hotspot. Further research would be useful if it can lay the foundation for information sharing through a GIS Intranet portal.

An emerging niche in adventure tourism activity, such as smelling adventures (Swartbrooke et al., 2003), offers an opportunity to KZN tourism practitioners. KZN is rich in flora, and its sub-tropical setting makes it an ideal setting for those adventure travellers interested in this form of adventure activity. Related to smelling adventure activities is the traditional medicinal remedies used by the Zulus. TKZN can work closely with locals to create a unique adventure activity that merges the more traditional remedies with the more scientific homeopathic approach. Adventurers can be taken on a tour to remote areas where traditional Sangomas (traditional Zulu doctors) and homeopathic researchers can show specific plants which are proven to heal certain health conditions.

The adventurers can provide useful information with regard to the proposed mobile GIS framework criteria. Reliable controlled trials could provide more definitive evidence with regard to the suggested framework criterion of the mobile GIS. It would also be useful to conduct research on the locals in KZN. Some useful research could be centred on the locals' willingness to work in tourism, their opinion of foreign travellers and their understanding of preserving their traditional way of life. Future research would be extremely valuable if it could lay the framework for locals in developing countries to treat tourists with respect and tolerance, while at the same

time staying true to their local way of life and still managing to earn an income from working in the tourism sector.

There are a number of possibilities for future research regarding the collation of information prompts. In relation to category 1 information (see Table 4.1), there is an opportunity to have a centralised listing at an accessible location. The TKZN website seems to be the most convenient location at this point in time. If information is lacking, the TKZN official can contact the responsible provincial or national organisations and initiate the process of sourcing the information and capturing it on TKZN website.

It was also suggested that a storyline approach (Jamieson, 2006) be adopted to educate the adventurer about the culture and heritage of the province. This would firstly require extensive sourcing and collation of information. Secondly, the information will have to be transformed into a storyline for implementation on a mobile GIS platform.

Unfortunately the KZN province has high rates of crime. With today's advanced tracking systems, it is possible to have a 24-hour call centre tracking the movement of the traveller. Any deviation from the proposed profile path can lead to a direct call from a trained call centre operator. The integration of a call centre will therefore add value to criterion 7 of the mobile GIS framework. (The adventurer can, for example, often land in areas where his/her safety is at risk.)

There is no doubt that in future, mobile technology will play a major role in guiding tourists and, most probably, adventurers into remote pristine hotspots. The impact on the environment and locals is cause for concern. There are legislative and authoritative bodies that are tasked with ensuring that the natural environment is managed in a sustainable manner. It is possible to modify existing policies with regard to pristine remote hotspots. Further research should bring together the necessary data sets and tourism practitioners' viewpoints in a collaborative strategy to forge towards a unique conservation policy for agreed on 'remote and pristine' hotspots. This could be useful especially with regard to future developments that are likely to occur in the remote pristine hotspots of KZN.

5.8 Concluding remarks

This research focused on the adventure traveller who is interested in remote pristine hotspots. A concern is that irresponsible behaviour on the adventurer's part could lead to the destruction of the fragile natural environment and could negatively interfere with the local traditional cultural values. This research identified adventure hotspots by using the functionalities of a GIS. These findings (a total of 263 5 × 5 km² grid cells) were validated by tourism practitioners in the KZN province. The results suggest that the practitioners were generally satisfied with the applied methodology and the resultant hotspot map. The questionnaire survey added valuable information with regard to managing a hotspot and measures that can positively influence the behaviour of the adventure when visiting an adventure hotspot.

The researcher also proposed a practical solution that could improve or enhance the behaviour of adventurers when in an adventure hotspot. Existing media were collated into information prompts. These information prompts were categorised in tables that could be linked to a mobile GIS environment. It is important to mention that these prompts were examples and would, in a real-life situation, require more stringent data collection and analysis by experts in the field. The researcher then examined the framework requirements for a mobile GIS. The approach merged existing mobile applications, theoretical guidelines and adventure characteristics. This resulted in a set of seven criteria that brought together the core essentials required for the conceptual framework of a mobile GIS device dedicated to the adventure in KZN.

To conclude, it is important to state that these findings, although spatially restricted to the KZN province, can be implemented at a universal scale. Similar spatial data can be collected for any local area which can then be analysed using the GIS methodology adopted in this study. The mobile knowledge can also be replicated on a universal scale. It would require a focused data collection for a local region (anywhere in the world) followed by adopting a similar methodology as proposed in this study.

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Appendices

Appendix 1: Questionnaire

Adventure tourism in KwaZulu-Natal: Hotspot identification and mobile knowledge.

Student number: 31762778 - Masters in Geography at UNISA

Introduction:

It is important to responsibility manage precious resources in a sustainable manner. One of the primary objectives of this research is to ensure that decision making is based on both solid information systems and valuable local expert knowledge. It is with this in mind that we hope to engage you in your capacity as a tourism stakeholder to fill out this questionnaire which should only take a few minutes.

A questionnaire designed specifically for the members of the Provincial tourism forum (PTF) - Tourism KwaZulu-Natal (TKZN).

On behalf of the researcher (Kshetra Govindasamy) and the supervisors (Chris Vlok & Dr. Alet Harmse) we thank you in advance for participating in this questionnaire.

Attached to this questionnaire are the following map:

Map 1: Identified hotspots

Section A: Background information

1. In which of the tourist regions (as identified by TKZN) are you actively working in? Please tick the relevant box or use 1.9 to specify an option that is not available.

1.1	Battlefields	
1.2	Zululand	
1.3	Pietermaritzburg/Midlands	
1.4.	South Coast	
1.5.	UKhahlamba Drakensberg	
1.6.	North Coas	
1.7.	Elephant Coast	
1.8.	Durban	

1.9. Other, please specify,

2. Which of the options below best describes your job title, please tick the relevant box or specify in 2.7.

2.1	Tourism Destination management officer	
2.2	Management	
2.3	Personal assistant	
2.4	Consultant	
2.5	Researcher	
2.6	Tour operator	

2.7. Other, please specify,

3. How long have you been working in tourism sector. Enter a value into the box provided below.

Section B: Validation of research methodology

Please read all the questions in section B first before attempting to answer question one,

4. Refer to map 1. On a scale of 1 – 5, do you agree with the procedure applied (as explained in the presentation) to identify adventure hotspots in the KwaZulu-Natal Province?

Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1	2	3	4	5

5. From your knowledge can you suggest other features or phenomenon that should have been included in the analysis process? (refer to legend of map 1 to get an idea of the features used in the procedure)

6. Refer to the regional map relevant to your working area. If you chose 1.10 as your answer to question one, please choose a regional map which you have good knowledge of.
   6.1 Express your satisfaction with the spatial patterns in the map.

Strongly dissatisfied	Dissatisfied	Neutral	Satisfied	Extremely Satisfied
1	2	3	4	5

6.2 With your working experience in your local region can you identify other hotspots that have been excluded in your relevant working map? Use the Alphanumeric indexing system provided and list in the box provided below.

	e.g. Aa2 , Bb4

6.3 With your working experience in the local region can you identify those hotspots that are truly new to you, i.e. you did not expect to see them as potential hotspots. List the areas by referring to the identified labels.

	e.g. C1, C2

Section B: Planning for sustainable tourism at identified hotspots.

This section relates to your experiences and knowledge of engaging locals in decision making at the identified hotspots.

7. Taking into consideration the pristine and remote nature of all these hotspots (map 1), read the following in relation to responsible planning and answer question 8.

7.1 Ensure communities are involved in and **benefit** from tourism (at the identified hotspots – map1)
7.2 **Market** tourism that is responsible, respecting local, natural and cultural environments (at the identified hotspots – map1)
7.3 **Involvement** of the local community in planning and decision making (at the identified hotspots – map1)
7.4 Usage of local resources **sustainably** (at the identified hotspots – map1)
7.5 Be **sensitive** to the host culture at these destinations (at the identified hotspots – map1)
7.6 Maintain and encourage natural, economic, social and cultural **diversity** (at the identified hotspots – map1)
7.7 Undertake **assessment** of environmental, social and economic impacts as a prerequisite to developing tourism (at the identified hotspots – map1)

8. Now that you have read the above (7), choose the 3 most important with regard to the hotspots as identified in Map 1.

	Item number (e.g. 7.1. 7.3, 7.7)
Most important	
Second most important	

Third most important	

9.

9.1 Referring to your working regional map, have you initiated contact and engaged the locals in decision making at any of these identified hotspots. Please insert a tick into the relevant box

Yes	
No	

9.2 If your answer in the previous section is YES, please list the hotspots by using the annotated labels on the relevant working map (3.1 – 3.9) and enter into the box provided below.

10. What is the best medium of communication to initiate local involvement in the identified hotspots?

10.1 Participate in a workshop with local amaKhosi / Local representative and other community elders from surrounding areas.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

10.2 Telephone interviews and surveys with amaKhosi / Local representative.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

10.3 Email correspondence with amaKhosi / Local representative.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

10.4 One on one interview with amaKhosi / Local rep.

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

Other, Please specify,

11. From the previous question, which in your opinion will work the best? Enter just ONE option into the box provided below

12. Define an ‘adventure tourism destination’ by entering a few key words into the box below.

13. Continually reminding the adventure traveller on responsible behaviour is important to the sustainability of the destination. Certain measures, tools and media can be put in place to ensure this, can you name at least four that in your opinion could work in the identified hotspots.

1 _____

2_____

3_____

14. A Mobile Geographic Information system (GIS) on a hand-held device has been identified as a medium to unobtrusively remind the adventurer of the unique & fragile resources that are present in these hotspots thus allowing the user to partake wholeheartedly in the unfolding adventure whilst still being a responsible traveller.

14.1 Do you agree with the above statement?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

14.2 Who, in your opinions should manage the development of such an application?

14.2.1 Government

Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

14.2.2 Industry

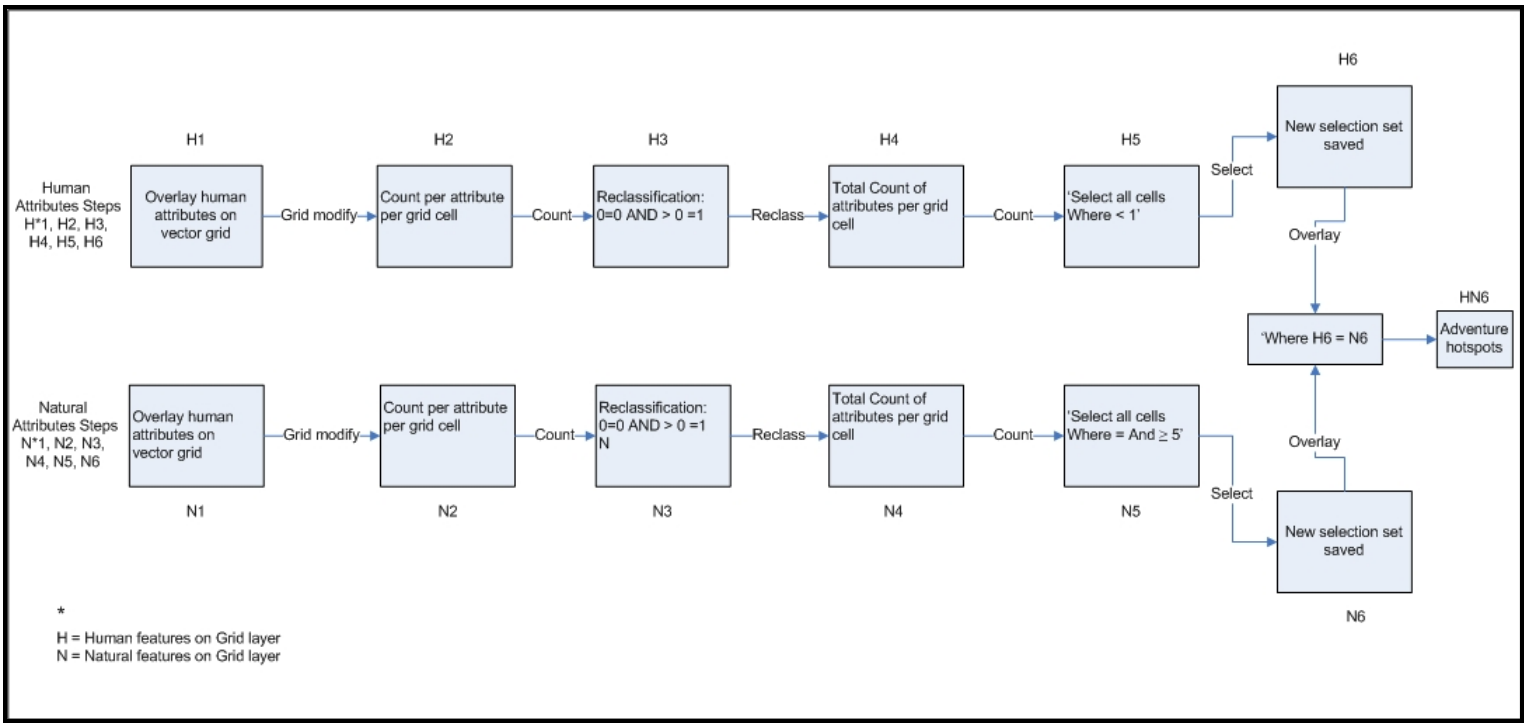
Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

14.2.3 Industry + Government

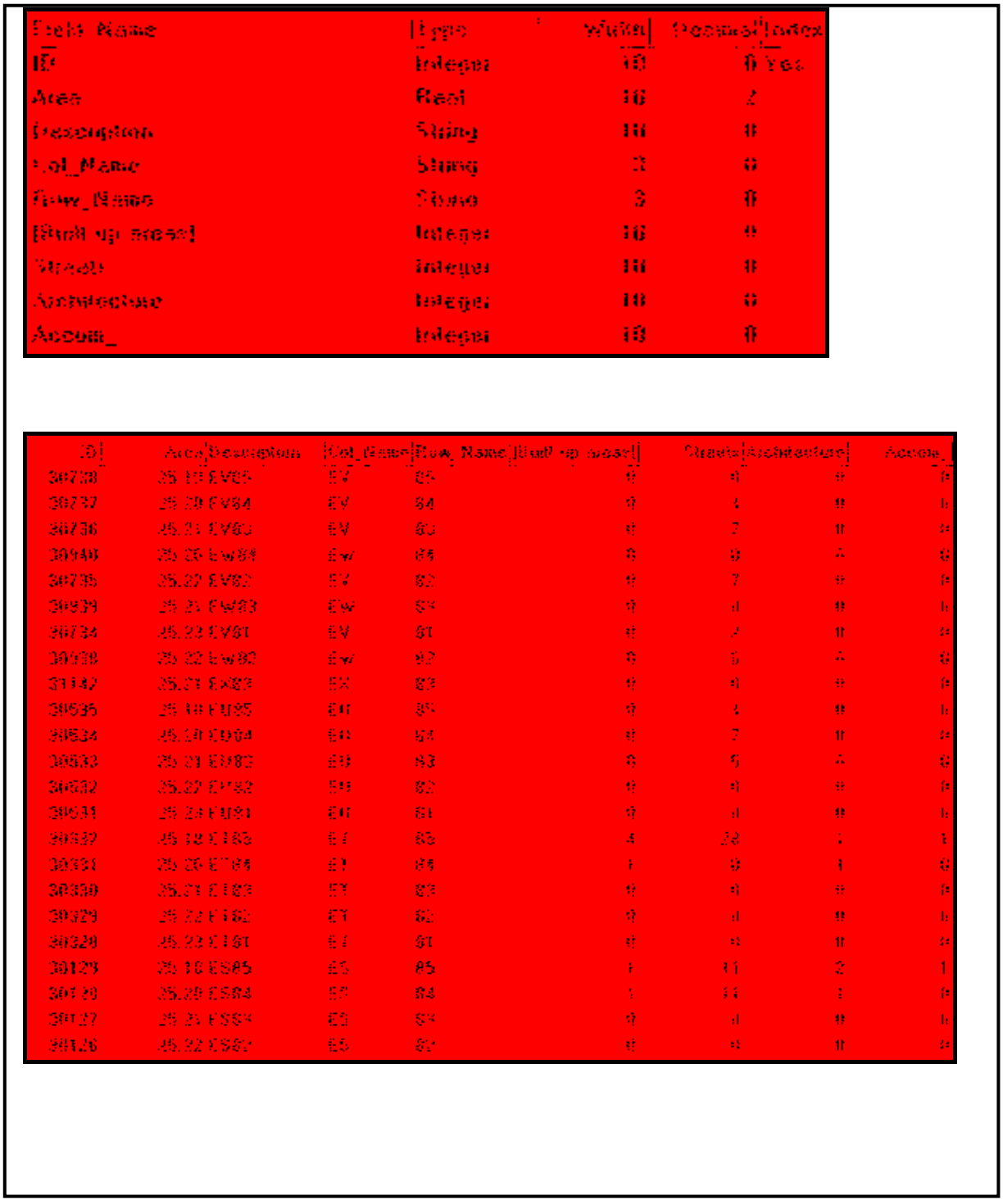
Definitely not	Not really	Yes, I think so	Definitely yes
1	2	3	4

Comment (optional):

Appendix 2: GIS process flow for human and natural attributes



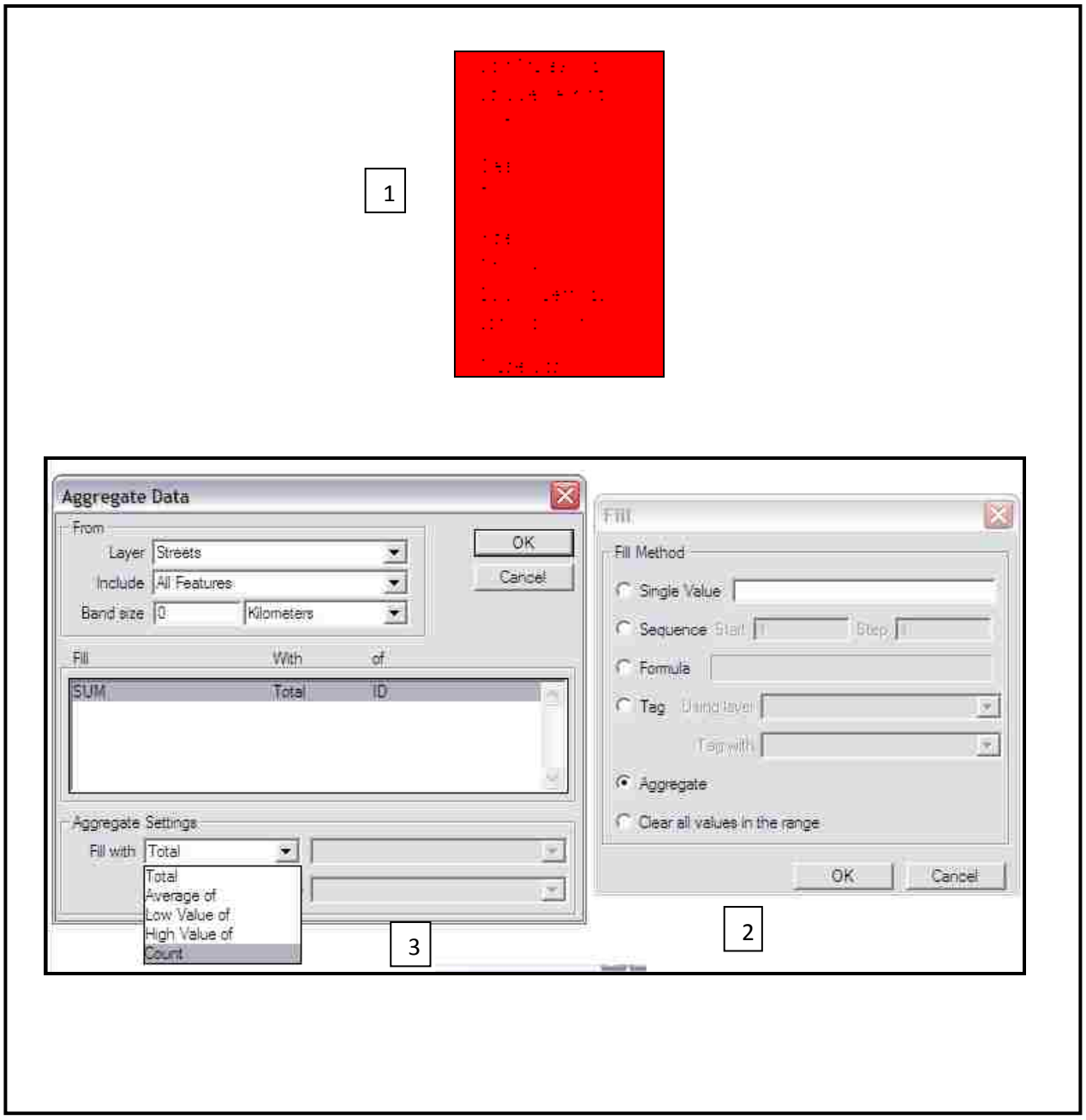
Appendix 3: Modification of the vector grid alphanumeric table for human attributes



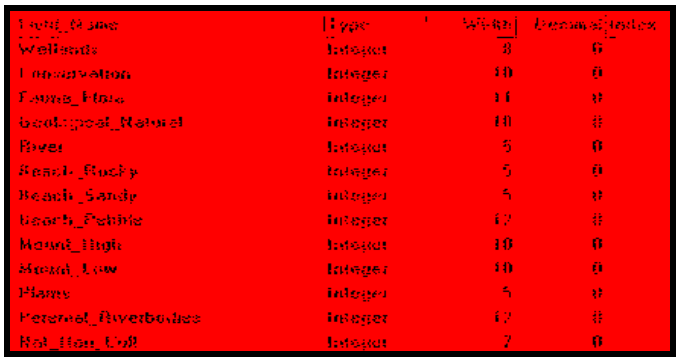
Field Name	Type	Width	Decimal Places
ID	Integer	10	0
Area	Real	10	2
Description	String	100	0
Col_Name	String	3	0
Row_Name	String	3	0
Build up area?	Integer	10	0
Streets	Integer	100	0
Architecture	Integer	10	0
Access_	Integer	10	0

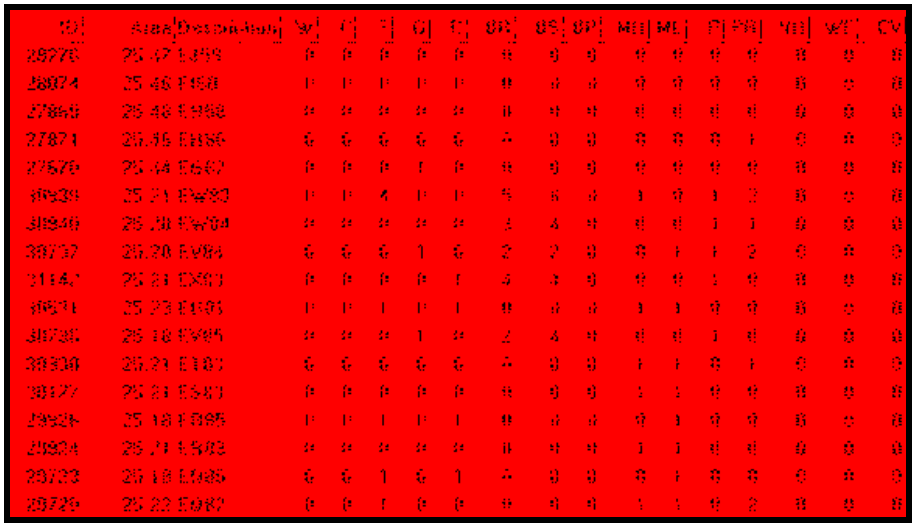
ID	Area	Description	Col_Name	Row_Name	Build up area?	Streets	Architecture	Access_
30733	25.19	EV85	EV	85	0	0	0	0
30732	25.20	EV84	EV	84	0	1	0	1
30731	25.21	EV83	EV	83	0	2	0	2
30730	25.22	EV82	EV	82	0	3	1	3
30729	25.23	EV81	EV	81	0	4	1	4
30728	25.24	EV80	EV	80	0	5	1	5
30727	25.25	EV79	EV	79	0	6	1	6
30726	25.26	EV78	EV	78	0	7	1	7
30725	25.27	EV77	EV	77	0	8	1	8
30724	25.28	EV76	EV	76	0	9	1	9
30723	25.29	EV75	EV	75	0	10	1	10
30722	25.30	EV74	EV	74	0	11	1	11
30721	25.31	EV73	EV	73	0	12	1	12
30720	25.32	EV72	EV	72	0	13	1	13
30719	25.33	EV71	EV	71	0	14	1	14
30718	25.34	EV70	EV	70	0	15	1	15
30717	25.35	EV69	EV	69	0	16	1	16
30716	25.36	EV68	EV	68	0	17	1	17
30715	25.37	EV67	EV	67	0	18	1	18
30714	25.38	EV66	EV	66	0	19	1	19
30713	25.39	EV65	EV	65	0	20	1	20
30712	25.40	EV64	EV	64	0	21	1	21
30711	25.41	EV63	EV	63	0	22	1	22
30710	25.42	EV62	EV	62	0	23	1	23
30709	25.43	EV61	EV	61	0	24	1	24
30708	25.44	EV60	EV	60	0	25	1	25
30707	25.45	EV59	EV	59	0	26	1	26
30706	25.46	EV58	EV	58	0	27	1	27
30705	25.47	EV57	EV	57	0	28	1	28
30704	25.48	EV56	EV	56	0	29	1	29
30703	25.49	EV55	EV	55	0	30	1	30
30702	25.50	EV54	EV	54	0	31	1	31
30701	25.51	EV53	EV	53	0	32	1	32
30700	25.52	EV52	EV	52	0	33	1	33
30699	25.53	EV51	EV	51	0	34	1	34
30698	25.54	EV50	EV	50	0	35	1	35
30697	25.55	EV49	EV	49	0	36	1	36
30696	25.56	EV48	EV	48	0	37	1	37
30695	25.57	EV47	EV	47	0	38	1	38
30694	25.58	EV46	EV	46	0	39	1	39
30693	25.59	EV45	EV	45	0	40	1	40
30692	25.60	EV44	EV	44	0	41	1	41
30691	25.61	EV43	EV	43	0	42	1	42
30690	25.62	EV42	EV	42	0	43	1	43
30689	25.63	EV41	EV	41	0	44	1	44
30688	25.64	EV40	EV	40	0	45	1	45
30687	25.65	EV39	EV	39	0	46	1	46
30686	25.66	EV38	EV	38	0	47	1	47
30685	25.67	EV37	EV	37	0	48	1	48
30684	25.68	EV36	EV	36	0	49	1	49
30683	25.69	EV35	EV	35	0	50	1	50
30682	25.70	EV34	EV	34	0	51	1	51
30681	25.71	EV33	EV	33	0	52	1	52
30680	25.72	EV32	EV	32	0	53	1	53
30679	25.73	EV31	EV	31	0	54	1	54
30678	25.74	EV30	EV	30	0	55	1	55
30677	25.75	EV29	EV	29	0	56	1	56
30676	25.76	EV28	EV	28	0	57	1	57
30675	25.77	EV27	EV	27	0	58	1	58
30674	25.78	EV26	EV	26	0	59	1	59
30673	25.79	EV25	EV	25	0	60	1	60
30672	25.80	EV24	EV	24	0	61	1	61
30671	25.81	EV23	EV	23	0	62	1	62
30670	25.82	EV22	EV	22	0	63	1	63
30669	25.83	EV21	EV	21	0	64	1	64
30668	25.84	EV20	EV	20	0	65	1	65
30667	25.85	EV19	EV	19	0	66	1	66
30666	25.86	EV18	EV	18	0	67	1	67
30665	25.87	EV17	EV	17	0	68	1	68
30664	25.88	EV16	EV	16	0	69	1	69
30663	25.89	EV15	EV	15	0	70	1	70
30662	25.90	EV14	EV	14	0	71	1	71
30661	25.91	EV13	EV	13	0	72	1	72
30660	25.92	EV12	EV	12	0	73	1	73
30659	25.93	EV11	EV	11	0	74	1	74
30658	25.94	EV10	EV	10	0	75	1	75
30657	25.95	EV09	EV	09	0	76	1	76
30656	25.96	EV08	EV	08	0	77	1	77
30655	25.97	EV07	EV	07	0	78	1	78
30654	25.98	EV06	EV	06	0	79	1	79
30653	25.99	EV05	EV	05	0	80	1	80
30652	26.00	EV04	EV	04	0	81	1	81
30651	26.01	EV03	EV	03	0	82	1	82
30650	26.02	EV02	EV	02	0	83	1	83
30649	26.03	EV01	EV	01	0	84	1	84
30648	26.04	EV00	EV	00	0	85	1	85
30647	26.05	EW99	EW	99	0	86	1	86
30646	26.06	EW98	EW	98	0	87	1	87
30645	26.07	EW97	EW	97	0	88	1	88
30644	26.08	EW96	EW	96	0	89	1	89
30643	26.09	EW95	EW	95	0	90	1	90
30642	26.10	EW94	EW	94	0	91	1	91
30641	26.11	EW93	EW	93	0	92	1	92
30640	26.12	EW92	EW	92	0	93	1	93
30639	26.13	EW91	EW	91	0	94	1	94
30638	26.14	EW90	EW	90	0	95	1	95
30637	26.15	EW89	EW	89	0	96	1	96
30636	26.16	EW88	EW	88	0	97	1	97
30635	26.17	EW87	EW	87	0	98	1	98
30634	26.18	EW86	EW	86	0	99	1	99
30633	26.19	EW85	EW	85	0	100	1	100
30632	26.20	EW84	EW	84	0	101	1	101
30631	26.21	EW83	EW	83	0	102	1	102
30630	26.22	EW82	EW	82	0	103	1	103
30629	26.23	EW81	EW	81	0	104	1	104
30628	26.24	EW80	EW	80	0	105	1	105
30627	26.25	EW79	EW	79	0	106	1	106
30626	26.26	EW78	EW	78	0	107	1	107

Appendix 4: Flow of the count command in the GIS



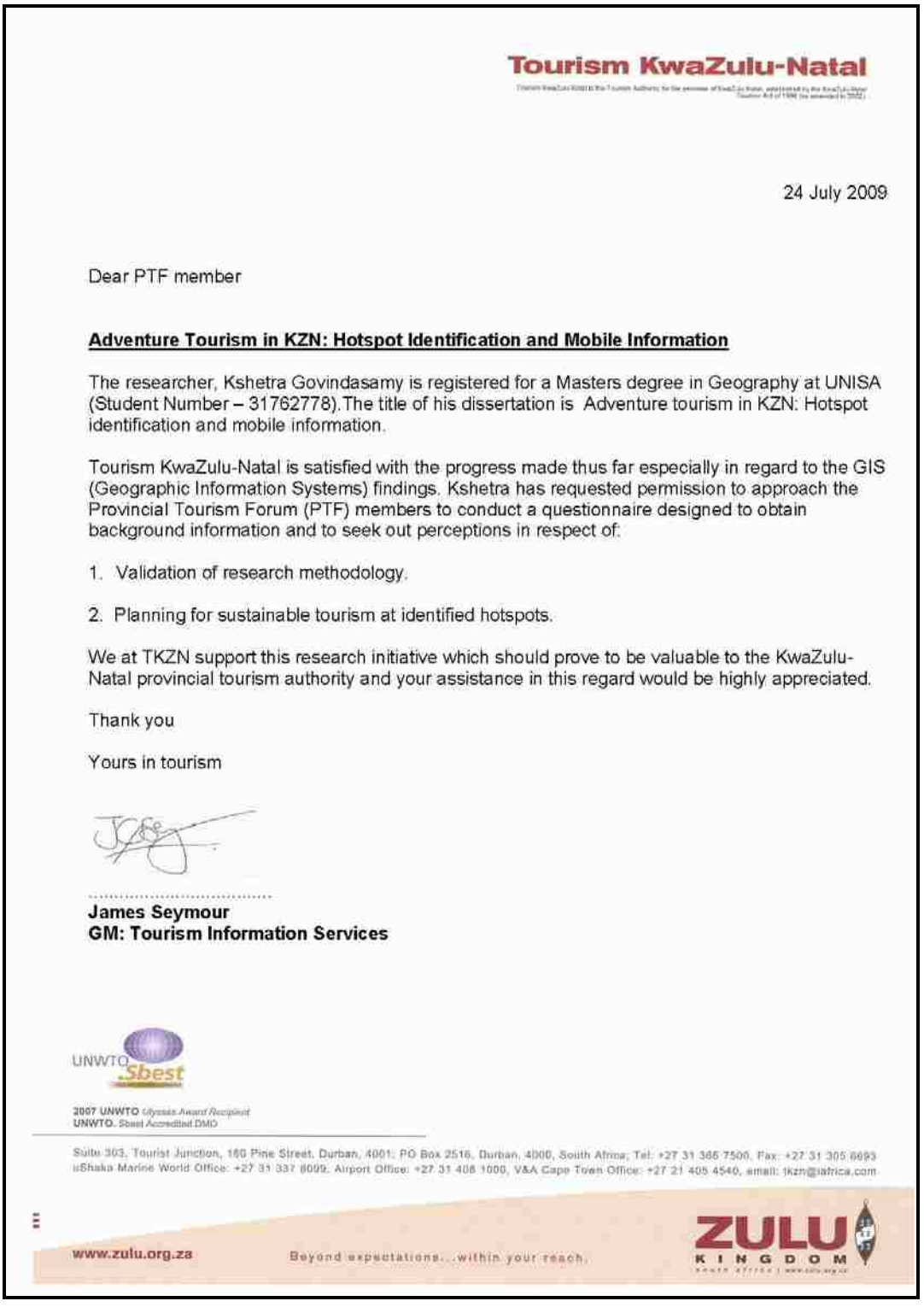
Appendix 5: Modification of the grid layer: natural attributes





Spatial layer name	Abbreviation
Wetlands	W
Conservation	C
Fauna_Flora	F
Geological Natural	G
River	R
Beach Rocky	BR
Beach Sandy	BS
Beach Pebble	BP
Mount_High	MH
Mount_Low	ML
Plains	P
Perenial_Riverbodies	PR
Natural Heritage Cultural	NH
Waterfalls	WF
Caves	CV

Appendix 6: Letter of motivation from TKZN



Tourism KwaZulu-Natal

24 July 2009

Dear PTF member

Adventure Tourism in KZN: Hotspot Identification and Mobile Information

The researcher, Kshetra Govindasamy is registered for a Masters degree in Geography at UNISA (Student Number – 31762778). The title of his dissertation is Adventure tourism in KZN: Hotspot identification and mobile information.

Tourism KwaZulu-Natal is satisfied with the progress made thus far especially in regard to the GIS (Geographic Information Systems) findings. Kshetra has requested permission to approach the Provincial Tourism Forum (PTF) members to conduct a questionnaire designed to obtain background information and to seek out perceptions in respect of:

1. Validation of research methodology.

2. Planning for sustainable tourism at identified hotspots.

We at TKZN support this research initiative which should prove to be valuable to the KwaZulu-Natal provincial tourism authority and your assistance in this regard would be highly appreciated.

Thank you

Yours in tourism

.....

James Seymour
GM: Tourism Information Services

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Appendix 7: Adventure categories — TKZN