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Valuing an Ecotourism Resource: A Case Study of the Boulders Beach African Penguin Colony

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February 2011-02-07

Submitted in partial fulfilment of the requirements for the degree of

Masters of Science in Conservation Biology

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ABSTRACT

The colony of African Penguins at Boulders, Simons Town on the southern Cape Peninsula, Western Cape formed in 1985, and is now a major ecotourism destination. The African Penguin is listed as Endangered due in part to competition with commercial fisheries. Improvements in the spatial management of these fisheries could assist with the conservation of the penguins, but would be costly. Various techniques were used to estimate the value of the colony, and to assess its impact on the economy of the southern Peninsula. Annual visitation rates have increased from 320,000 visitors in 1995 to over half a million visitors in 2009/10, generating R14.5 million in park revenues. A contingent valuation study revealed that visitors would be willing to pay an extra R11 million per annum over the current gate revenues without any additional investment by SANParks (the managing body at Boulders). When informed about the poor conservation status of the African Penguin, half of the visitors expressed an increased willingness to pay, and the total value increased to R31 million per annum (including current gate charges). A travel cost analysis revealed a consumer surplus of the Cape residents of just under R3 million as an estimate of the value of the penguin colony. A survey of local businesses revealed that the presence of the colony increased custom in towns up to 17 km away from Boulders. The current total value of the colony is estimated to be R28 million, R10 million more than it was 15 years ago. Although there has been a general improvement in the attitudes of the local residents towards the penguins and their management over the past 15 years, this relationship could be further enhanced by some small changes in SANParks management, such as improved responsiveness to problems or complaints. Park users also made some suggestions, such as more detailed information on the penguins being made available. Boulders is a successful ecotourism destination, and could be used as a model for development of additional sites, particularly with regard to other penguin colonies, thus enhancing the total economical value of the African Penguin. The current penguin value, and its potential for future increase, can be used as justification to governing bodies to invest in measures of protection of the colony through, for example, an improvement in the spatial management of the fishing industry.

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Acknowledgements

I would like to thank my supervisors Peter Ryan and Jane Turpie for their assistance in the initial project planning stages, and continued support throughout the analysis and writing of the project. I would also like to thank Monique Ruthenberg from SANParks for her advice and assistance in constructing the questionnaire, and continued on-site support at Boulders. I also thank all of the SANParks staff at Boulders for assisting with the gate entry data collection. Finally, I would like to thank my classmates for their continued emotional support throughout the length of the course.

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CHAPTER 1

Literature Review

INTRODUCTION

Over twenty five years ago, a breeding pair of African Penguins, *Spheniscus demersus*, arrived at Boulders, Simons Town, on the southern peninsula of Cape Town. The numbers of penguins grew rapidly over the following few years, and soon there was a fully established colony along Boulders beaches. Prior to the arrival of the penguins, Boulders was a recreational beach area used mostly by local residents. By 2010, Boulders was a major ecotourism destination, drawing half a million visitors each year to view what has recently been listed as an endangered species (IUCN 2010). Boulders has two beaches. Utilisation of the northern beach (Foxy beach) is now prohibited to avoid disturbance of this important colony, and access to the penguins is restricted to viewing boardwalks over the beach. Use of the southern beach (Boulders beach), also visited by the Penguins, is still permitted, but entrance to the entire area is charged by the managing body, South African National Parks (SANParks). The establishment of the colony and its inclusion in the Table Mountain National Park transformed the beach and local town from a naval coastal municipality into a popular destination for tourists across the world. The hitherto free access beach now generates park revenues of R14.5 million per annum, and a variety of businesses have moved into the area to capitalise on the visiting tourists. The declining world population of African Penguin is at risk of extinction due to a number of compounding factors. Historical factors, such as the collection of eggs for human consumption, guano mining, and habitat depredation caused major population declines in the 20th century (Frost et al. 1976; Shannon and Crawford 1999; Crawford et al. 2001; Cuthbert et al. 2009). Competition with the commercial fishing industry

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represents the most significant threat to the survival of the penguins today, and this problem is exacerbated by recent changes in the distributions of sardine (Crawford 1998; Shannon et al. 2004; Griffiths et al. 2004; Pichegru et al. 2009). There is a need to highlight the economic importance of the colony in Simons Town so that costly conservation efforts to protect the species can be justified to sponsoring bodies, the fishing industry, and government alike.

Tourism and the Environment

Tourism and the environment are interdependent (Eagles et al. 2002; Mak 2004). The establishment and existence of many protected areas, and the conservation of the wildlife within them, relies on the income generated by visiting tourists (Dharmaratne et al. 2000; Eagles et al. 2002). Conversely, the future of much nature-based tourism relies on the existence and conservation of protected areas. For example, at the end of the 20th century, the fees paid by tourists to view gorillas in Uganda subsidized all of the national parks throughout the country (Mastny 2002).

Globally, tourism is an increasingly important activity, generating a volume of business that now surpasses that of oil exports, food products, and automobiles (World Tourism Organization website, http://unwto.org/en/about/tourism?op=1 'Why Tourism?' 2010). The revenue generated by export earnings in international tourism alone was estimated to be US$852 billion in 2009, and it has been predicted that by 2020, the number of international arrivals will have surpassed 1.5 billion people globally (United Nations World Tourism Organisation 2009). Tourism has diversified into many different categories and niche speciality forms, including religious tourism, cultural tourism, and culinary tourism (Rinschede 1992; Silberberg 1995; Richards 1996; Long 2004).

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Despite the increase in all forms of tourism over the past few decades, it is thought that the era of mass tourism, lacking consideration for the culture and environment of host countries, is nearing its end (Mak 2004). During the 1980s it became apparent that there was a need for more environmentally sensitive tourism practices (Saarinen et al. 2009). The paradigm of 'sustainable development', first introduced in the 1987 Brundtland Report by the World Commission on Environment and Development (WCED 1987) and later promoted during the Rio Earth Summit in 1992, was integrated into the tourism industry in the 1995 World Conference on Sustainable Tourism (Mak 2004). 'Sustainable tourism' is development which satisfies tourists and host regions, fulfils economic, social, and aesthetic needs, and leads to the management of resources ensuring that ecological processes and biological diversity is maintained (WTO 2001).

Integrating sustainability into the partnership between tourism and the environment is difficult due to the complex and varied nature of each of the aspects involved (Saarinen et al. 2009). Despite this, the demand for sustainability has grown over the past three decades, and sustainable tourism has increased in popularity alongside improvements in the legislative control governing how tourism can be conducted optimally to ensure its future existence and that of the planet (Clarke 1997; Saarinen et al. 2009). Such tourism offers a realistic opportunity for the long term conservation of wildlife resources; support which is particularly important considering the current rate of habitat destruction and loss of species (Wilson and Tisdell 2001).

Sustainable tourism is commonly considered applicable only towards visitation to the natural world, but the concept can be used as a cognitive framework and applied more widely as a guide to all forms of tourism (Macbeth 2005). The term 'ecotourism' is often wrongly used

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interchangeably with 'sustainable tourism'. The concept of ecotourism has evolved since Hetzer first coined the term in 1965, and despite many years of debate and controversy over an exact definition, the basic meaning of ecotourism specifically refers to nature-based tourism (Hetzer 1965). Ecotourism focuses on minimising the negative impacts on the environment and society (i.e. tourism conducted in a sustainable manner), and maximising economic benefits and recreational satisfaction (Hetzer 1965; World Bank 2002). This type of tourism is characterised as producing a net benefit for the resource, often with additional gains in the economic, political, social, and scientific divisions (Hingham 2007). Ecotourism is important to conservation ventures, as it boosts the economic value of natural systems or species, and sometimes can enhance conservation prioritisation when the value of these resources is appreciated. Despite the unique impacts and challenges that are associated with ecotourism, the concept has remained, and indeed developed into the global travel phenomenon that it is today, with an ever growing number of sites being developed for ecotourism (Wheeller 1991; Yorio et al. 2001; Björk 2007).

In 2005, Africa's share of global tourism was recorded as 5.6%; a small portion when considering the size and population of the continent (Mitchell and Ashley 2006; Rogerson 2009). Relative to other African countries, however, South African tourism is booming. The country has experienced mixed economic fortunes since political transformation in the early 1990s, but by the end of the 20th century, tourism emerged as a significant development option for post-apartheid South Africa (Binns and Nel 2002). The South African government has recognised the key role played by tourism in economic growth and poverty reduction (Department of Trade and Industry 2010a). In 2005, South Africa received 55.6% of international arrivals within southern Africa, and 83.7% of international tourism receipts (UNWTO 2006), and by 2009, international tourist arrivals had grown to just under 10 million

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people (Cape Town Routes Unlimited 2009). 59.9% of visitors to South Africa are travelling for leisure, as the country is renowned for its vineyards, bustling cities, and perhaps most famously, wildlife viewing in the many large game reserves, particularly the Kruger National Park (Cape Town Routes Unlimited 2010; Mabunda and Wilson 2009; Rogerson 2009).

Avitourism, specifically, is estimated to be the motivation for three million international trips worldwide annually (US Fish and Wildlife Service 2001; the Department of Trade and Industry 2010b). Estimates from 2009 considered South Africa's avitourism market to be between 21,000 and 40,000 tourists per annum, 40% of which are international visitors (Department of Trade and Industry 2010c). It is estimated that avitourism contributes up to two billion South African Rand annually to GDP (Department of Trade and Industry 2010c).

The Economics of Tourism

When conducted optimally, ecotourism offers a sustainable alternative to the harvesting and destruction of wildlife by raising local and national interest in conservation, and ultimately generating the revenues required to support conservation efforts (De Fontaubert et al 1996; Krüger 2005). In addition to these advantages, and arguably the factor of paramount importance in a political world, ecotourism can be used as a powerful tool for economic development across local, regional, and international scales (Rogerson 1997; Wood 2007; Saarinen 2009). If operated correctly, ecotourism is a harmless form of tourism that offers the potential for interests in conservation and economic development to work hand in hand (Cebellos-Lascurain 1996).

The support to the economy provided by ecotourism is particularly important in the developing world where many countries rely directly on their natural resource base for a large portion of

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their employment and national income (Dixon and Sherman 1990). Due to the low barriers to entry and its labour-intensive nature, the tourism industry is attractive to development agencies and governments alike (Cebellos-Lascurain 1996). As a result of increased work opportunities, women are often empowered through tourism employment, further helping to alleviate poverty (Neto 2003; Manwa 2009). Tourism is the second largest source of foreign exchange to lesser developed countries and it is the only service sector that provides concrete trading opportunities for all nations, regardless of their level of development (Diaz 2001; Neto 2003; Wood 2007). Besides the significant export earnings, international tourism generates a substantial share of government tax revenues worldwide (Neto 2003). The development of tourism is also usually associated with investments into infrastructure (e.g. airports, roads, sewerage and water facilities, etc.), benefitting not only the visiting tourists, but improving the standard of living for local residents (Sekercioglu 2002; Neto 2003).

In summary, ecotourism has great potential for creating immediate economic upliftment, and, if well managed, can result in the long term conservation of wildlife resources (Wilson and Tisdell 2001; Yorio et al 2001). Many conservation ventures struggle to acquire the funding necessary for successful intervention. Ecotourism can provide the economic rationale and motivation for governmental investment and community participation in conservation action, where both parties can reap the benefits of protecting their surrounding environment (Yorio et al 2001; Mak 2004). A decrease in the quality of the environment will inevitably decrease the appeal of the destination, and thus the local economy will suffer as a result (Wilson and Tisdell 2001; Mak 2004).

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Environmental Valuation

Society now appreciates the importance of conserving the world's natural areas, not just for economic provisioning and benefits such as ecotourism, but for ecosystem services, our enjoyment of the natural world, and the pure benefit of its existence. The protection of the environment has become one of the greatest concerns over the turn of the 21st century, and will increasingly be a major feature of today's political agenda (Garrod and Willis 1999). Market-based approaches to environmental regulation are increasingly popular, and thus the discipline of economics is ever expanding (Pate and Loomis 1997; Garrod and Willis 1999; Martín-López et al. 2008). Environmental economics attempts to identify and define the extent to which the market is affected by environmental changes, namely through the development of environmental valuation techniques (Garrod and Willis 1999).

Non-market valuation techniques estimate the value of a good that cannot be bought or sold on the market so that a monetary value can be applied to a non-market environmental aspect, and thus compared directly to market goods. One such method is the 'expressed preference technique' where individuals are asked explicitly how much they value an environmental good (Garrod and Willis 1999). Specifically, this study will focus on the Contingent Valuation Method (CVM); a method used to discover peoples' Willingness to Pay (WTP) for environmental goods (Carlsson and Martinsson 2001). Environmental goods and services can be divided into use and non-use values (Pate and Loomis 1997).

The CVM is based on asking people questions instead of directly observing their behaviour, and is thus controversial. Many scientists believe the approach to be invalid (King and Mazotta 2000) because the CVM fails to estimate individuals' maximum WTP accurately and can produce ambiguous results (Carlsson and Martinsson 2001). Inaccuracies could result

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from a 'warm glow' (Andreoni 1990) or a 'purchase of moral satisfaction' (Kahneman and Knetsch 1992) where this intrinsic positive feeling may cause a difference between hypothetical values found in the CVM, and actual payments (Carlsson and Martinsson 2001). 'Yea-saying' has also proved to be a source of error in CVM, where the respondents agree with the question in hand, or in this situation, estimate an inaccurately high WTP, simply to agree with or impress the interviewer (O'Conor et al. 1999; Blamey et al. 1999). It is also thought that CVM values are contingent upon the amount of information provided by the survey, as additional information to a respondent could alter their WTP estimation (Pate and Loomis 1997). However, despite these weaknesses of the CVM, studies have proven its validity in economic valuation and claim that when conducted effectively, the method cannot be rejected (Carlsson and Martinsson 2001).

The travel cost method (TCM) is an example of a 'revealed preference' valuation approach which is based on empirical data on users' actual behaviour. This idea considers the indirect costs incurred by an individual in travelling to reach the site of recreation, and uses this information to construct a demand curve (Bell and Leeworthy 1990, Hof and King 1992). The demand curve is then used to measure recreational benefit in the form of consumers' surplus (Bell and Leeworthy 1990, Hof and King 1992)

Despite the advantage of calculating the value of a resource by analysing actual visitor behaviour, i.e. their revealed preference, the TCM receives some criticism. The TCM cannot be used as a stand-alone technique for estimating recreational benefits (Randall 1994) because there are spatial limits that exist for its applicability, and inaccuracies could result if these limits are ignored (Smith and Kopp 1980). The TCM is best suited to recreational sites which draw only day visitors, and the analysis is significantly complicated by visitors on holiday, or

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stopping to visit a site without it being the sole purpose of the trip (Bell and Leeworthy 1990). It is argued that time costs should be included into a TCM as the availability of time itself has a value (McConnell and Strand 1981; McKean et al. 1995; Flemming and Cook 2008; Frank et al. 2008). However, the valuation of time is a complex issue and one that sparks controversy over the use of the TCM (McConnell and Strand 1981; McKean et al. 1995). One approach to dealing with the issue of time costs is to omit them (Flemming and Cook 2008). Allocating costs to travel distances is also a potential cause for some inaccuracy, as different vehicles and different locations could affect the costs. Finally, the socioeconomic characteristics will vary between individuals; for example, income, educational level, age, race, etc. (Bockstael et al. 1991). The zonal TCM approach neglects these individual differences, and as such, could cause inaccuracies in the results.

The African Penguin

The African Penguin is endemic to southern Africa. There are 29 known breeding localities along the coastlines of South Africa and Namibia (Shannon and Crawford 1999; Hockey et al. 2005; Whittington et al. 2005). The African Penguin was abundant at the start of the 20th century with an estimated 1.45 million adult birds at the Dassen Island colony alone (Shannon and Crawford 1999). Numbers were thought to have halved by the 1950s (Crawford et al. 1995), and today, the African penguin population is less than 10% of what it was 100 years ago, at just 52,000 mature individuals, and the species has recently been listed as endangered on the IUCN red list of endangered species (Whittington et al. 2000; IUCN 2010).

The continued existence of the African Penguin is at risk due to a number of different threats. Historically, penguin eggs were harvested and used for human consumption and curios sale (Cuthbert et al. 2009). Up to 25,200 eggs were collected per year in the 1920's, and an average

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of 48% of the eggs produced annually was removed (Shannon and Crawford 1999; Crawford et al. 2001). Predation also poses a risk for the African Penguin; for example, by Cape Fur Seals (*Arctocephalus pusillus pusillus*) and Kelp Gulls (*Larus dominicanus*) (Hockey and Hallinan 1981; David et al. 2003). Although a natural threat, predation is likely to have a greater impact today than on historical populations due to the small current population size of penguins, and the increasing predator numbers. Habitat degradation and disturbance through the collection of guano also had negative impacts on the penguins during the early 20th century (Frost et al. 1976). Although an infrequent and uncommon event, oil spills also have a significant impact. The sinking of the 'Apollo Sea' off the South African coast, for example, prompted a rescue mission where 10,000 oiled African Penguins were collected, approximately half of which could not be released (Crawford et al. 1999; Underhill et al. 1999). Diseases such as avian malaria and avian cholera, although uncommon, could also be a potential threat to their survival (Cranfield et al. 1994).

Arguably the greatest threat to the future existence of the African Penguin is simply a lack of food. The penguins' diet mostly comprises shoaling pelagic fish, particularly sardine *Sardinops sagax* and anchovy *Engraulis capensis* (Crawford et al. 2001). The Benguela upwelling system off the coast of South Africa brings small pelagic fish upon which the penguins, and other seabirds, rely (Crawford 1998). These species, however, are also targeted by the commercial fishing industry (Pichegru et al. 2009). Fluctuating environmental conditions combined with the threat of the fishing industry induce changes in the distribution of the fish, and risk population collapses (Crawford 1998; Shannon et al. 2004; Griffiths et al. 2004; Pichegru et al. 2009). The penguins are largely dependent upon these fish species, and changes in the distribution and population sizes of the fish induce changes in the breeding success and distribution of the penguins (Crawford 1998; Pichegru et al. 2009). Indeed, as fish

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stocks decrease, penguins reduce their breeding frequency as a strategy in response to tenuous energy budgets during the breeding season (Pichegru et al. 2010). As the fish stocks collapse further, the penguin population may no longer be sustained and could also collapse as a result (Crawford 1998; Pichegru et al. 2010).

Boulders Beach

Boulders in Simons Town on the southern Cape Peninsula, Western Cape, comprises a series of sandy beaches protected by large granite boulders. In 1983, the first breeding pair of penguins arrived at Boulders, and the colony rapidly increased to over 1000 pairs by 2003 (Peterson et al. 2006). The colony initially grew at an annual rate of 60%, far exceeding growth through natural reproduction alone, thus indicating immigration from other colonies (Crawford et al. 2000). The growth of the colony then slowed, possibly through a combination of density dependent effects on land and at sea, varying immigration levels, and limited food availability within foraging proximity to the colony (Peterson et al. 2006). The current population size at Boulders Beach is estimated to be around 940 breeding pairs (2011), and 3000 individuals (including juveniles) (pers. comm. Monique Ruthenberg, SANParks 02.02.11). Both the world and Boulders population are now showing a current decreasing trend in penguin numbers (Figure 1).

The arrival of the penguins at Boulders caused controversy among many of the local residents who had previously frequented penguin-free beaches for recreational purposes. Many of the penguins also nested in neighbouring gardens, making considerable noise and giving off unpleasant odours, further increasing the conflict with the neighbouring residences. As the penguin colony grew, it attracted increasing numbers of tourists, leading to further loss of amenity to the local residents. The Simons Town Municipality initially controlled the area and

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made some small-scale changes, such as the establishment of an entry fee, and the erection of a wooden fence to prevent the penguins from entering gardens. A study conducted in 1995 (Morgan 1996) revealed poor attitudes of the local residents towards the penguins and Simons Town Municipality. SANParks then took over management in 1998, when the beach became part of the Table Mountain National Park (TMNP). Under SANParks administration, developments to the area were made in an effort to further satisfy the demands of the local residents and to protect the penguins. A boardwalk was built for penguin viewing in 1999, and passage between the beaches and a penguin-proof fence was erected to prevent their entry into the adjacent gardens and roads. Public access to the beach is limited to one end of the area so as to prevent excessive disturbance to the penguins, particularly during the breeding season.

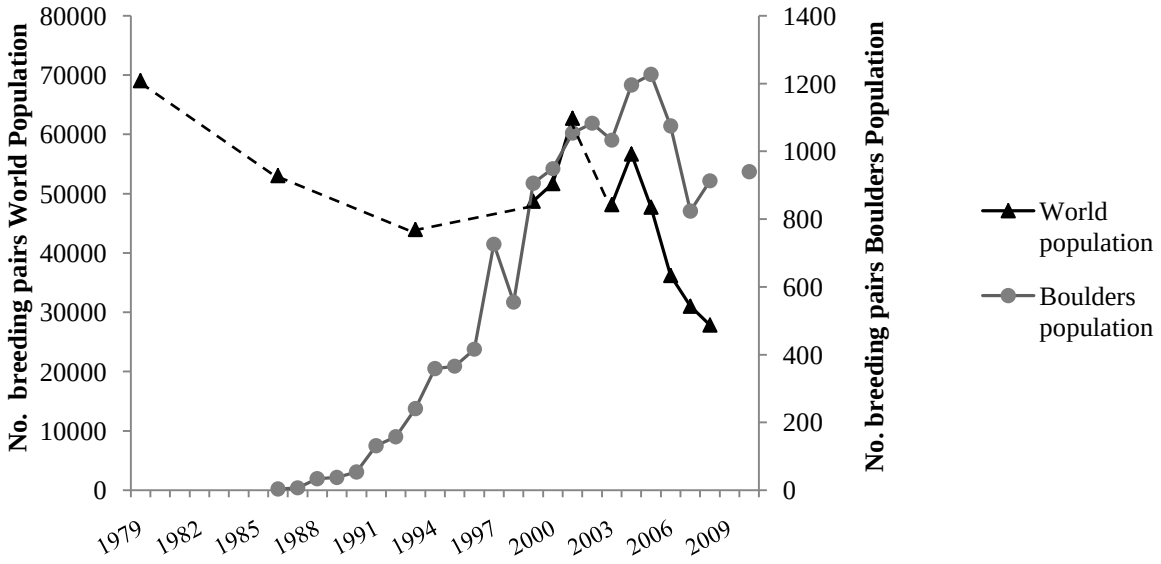

Figure 1. Change in the breeding population of African Penguins at Boulders, Simons Town, and in the world population. Solid lines show continuous data, hashed lines represent some data missing. Information sourced from R. J. M. Crawford, Oceans and Coasts, unpublished data, and the Cape Peninsular National Park visitor survey data 1999-2001.

Boulders is a popular tourist destination and attracts thousands of visitors each year. Due to the charged entry and the settlement of businesses in the area, the penguin colony appears to be a

valuable ecotourism destination. A study of the total financial impact on the existence of the colony was conducted in 1995 (Morgan 1996). Many changes to the facilities at Boulders have occurred since this study, and the popularity of Boulders as an ecotourism destination appears to have grown. The value of the colony today is thus unknown.

AIMS OF THE STUDY

The second chapter of this dissertation is a broad evidence valuation study that could be used as reference to other ecotourism ventures, both current and future. The chapter aims to estimate the current value of the penguin colony at Boulders, and assess how this value has grown over the past 15 years. The study will also assess the impact of the colony on the local economy. The third chapter of this study will provide parochial feedback to the SANParks, the current managing body at Boulders. The chapter aims to investigate how current attitudes of the local residents towards the colony and its management have changed over the past 15 years since Morgan's study (Morgan 1996). It will also identify areas for potential improvement in the management of Boulders according to both the local residents and the users of Boulders. The final chapter will act as a synthesis, summarising the main findings of the study, reporting on potential improvements, and highlighting possible avenues for future research.

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CHAPTER 2

Valuation of the Boulders Beach Penguin Colony

INTRODUCTION

Tourism is one of the world's largest industries, and through various improvements in technology and infrastructure, this lucrative trade is promised further future growth (UNWTO 2009). The need for environmentally sensitive practices of tourism became evident in the late 1980s, and thus the concept of sustainable tourism grew in popularity (Mak 2004, Saarinen et al 2009). 'Ecotourism' specifically refers to sustainable tourism of the natural world, and importantly offers a realistic opportunity for the long term conservation of wildlife resources through generating adequate revenue to support often costly conservation efforts (Hetzer 1965, De Fontaubert et al 1996, Wilson and Tisdell 2001, World Bank 2002, Krüger 2005). Environmental economics is emerging as a vital discipline in the future protection of environmental assets (Pate and Loomis 1997, Garrod and Willis 1999). An economic approach to conservation issues increases the appeal and attention of environmental goods to a wider audience, particularly within the political world (Pate and Loomis 1997, Garrod and Willis 1999). This study will utilise a combination of valuation techniques (Chapter 1) to estimate the value of an ecotourism resource.

The African Penguin, endemic to southern Africa, has proven to be a valuable ecotourism attraction, particularly at one of the more recently formed colonies 'Boulders Beach'. The first pair bred at Boulders in 1985, and the colony grew at an annual rate of 60% per year due to immigration from other colonies (Crawford et al. 2000). The colony reached over 1000 breeding pairs by 2003, but is now decreasing in population size, and in 2010, it is estimated

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that there were 940 breeding pairs (Monique Ruthenberg, SANParks, pers. comm) (see Chapter 1). The arrival of the colony at Boulders caused some controversy amongst the local residents. The South African Parks Board (SANParks) took over management from Simons Town municipality in 1998 and established the area as what is now a renowned ecotourism destination. The arrival of the penguins resulted in the loss of amenity of the beach for many of the local residents, and a study done in 1995 (Morgan 1996) revealed feelings of dissatisfaction amongst many of the previously regular visitors (Chapter 3).

The arrival of the colony did, however, not only provide a large source of revenue for SANParks, but to the local economy within Simons Town and Boulders through increased business from the visiting tourists. Today, the African Penguin is listed as Endangered on the IUCN red list of threatened species (IUCN 2010). The possible loss of the penguin colony at Boulders would not only result in an increased threat to the species as a whole, but there would be consequential impacts on the local economy as a result of the reduction in visiting tourists. The value of the penguin colony was obtained in a study by Morgan (1996) under the management of the Simons Town Municipality, and at a time when the penguins were listed as Lower Risk or Near Threatened (IUCN 2010). This chapter estimates the current value of the colony and its impact on the local economy, and assesses how that value has changed over the past 15 years following the changes in the penguin status, and in management and development in facilities at Boulders.

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METHODS

User Survey

The value of the Boulders penguin colony was assessed using both stated preference (contingent valuation) and revealed preference methods (travel cost). A questionnaire was developed (Appendix A) and visitors to Boulders were interviewed on weekdays and weekends from 10am until 4pm (peak visitation) between 12 October and 15 November 2010. Further surveys were conducted on the beach 6-7 January 2011 to ensure a comprehensive sample of visitors, both during and outside school holidays. Permission from the South African National Parks Board (SANParks) was obtained prior to the commencement of the survey. Visitors were surveyed both at the boardwalk at Foxy Beach (the northernmost end of Boulders) and at Boulders beach (the southernmost end of Boulders) (Figure 2). Users were chosen at random and interviewed face-to-face. Where there was greater than one respondent in the group, only the predominant respondent's answers were recorded. If they so requested, second respondents simultaneously completed a separate questionnaire. Records were kept of any refusals that were given. A single interviewer conducted all of the questionnaires to ensure continuity between surveys.

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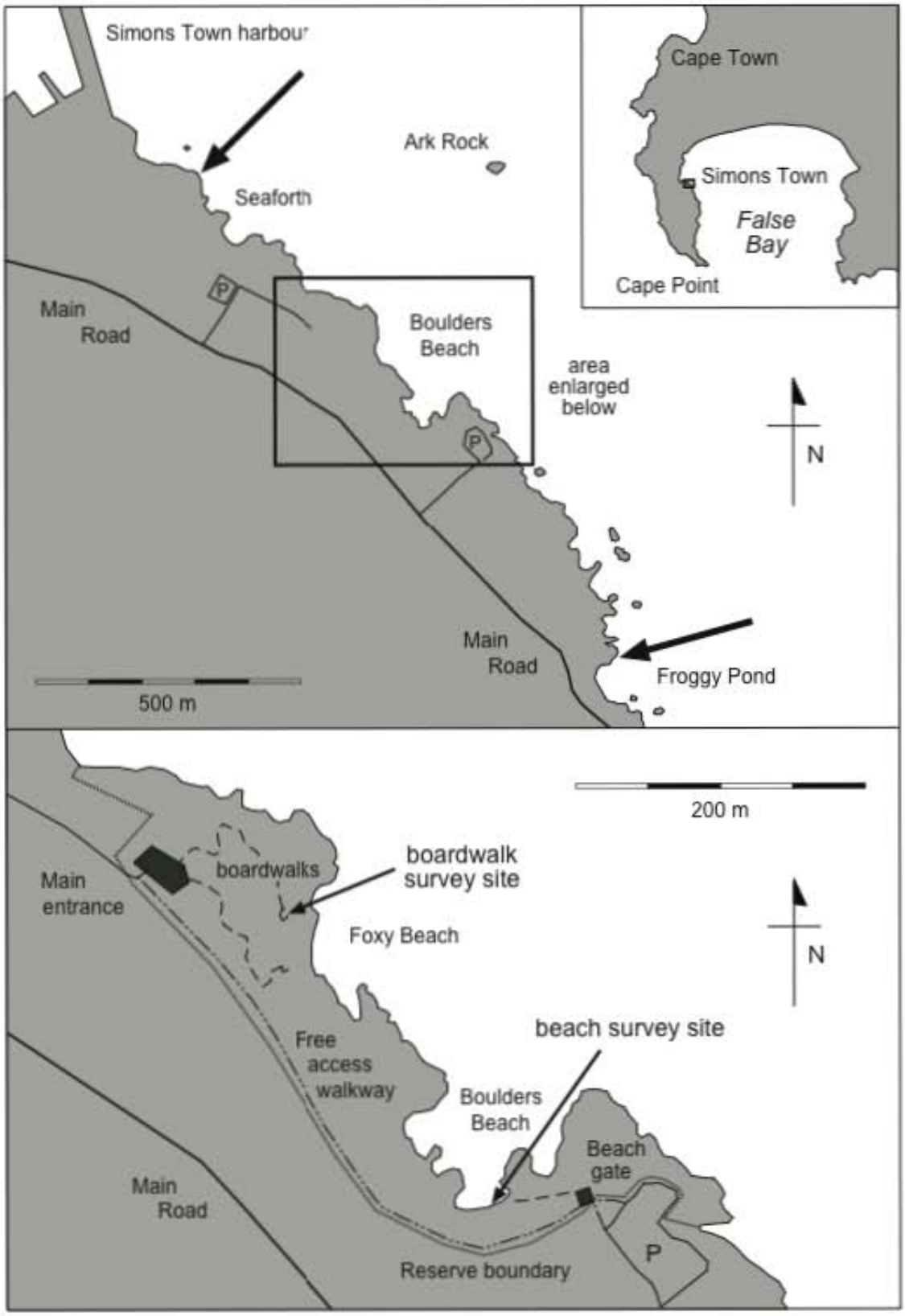

Figure 2. The Cape Peninsula (insert) and Boulders, Simons Town. The current range of the penguin colony falls within the major arrows (top image), and extends beyond the SANParks reserve boundary (detailed in lower image). Locations of the survey sites are indicated.

The questionnaire was developed based on the survey used by Morgan (1996) to allow comparison over time. Additional questions were developed to elicit the willingness to pay (WTP) of the visiting tourists, both before and after some information was given on the status of the penguin (not done in Morgan 1996). Where monetary values were given in alternative currencies, an online currency converter (http://www.xe.com/) was used to calculate the value in South African Rand at the time of the survey. Information was also obtained regarding the origin of the visitors and their mode of transport in order to estimate consumers' surplus using a travel cost analysis. A random survey was also conducted by SANParks staff at visitor entry to the boardwalk in order to gather supplementary data on visitors' countries of origin (Appendix B). These data were used to assess the comprehensiveness of the sample of visitors surveyed. Visitation rates to the beach were substantially lower, and it was therefore possible to obtain a more comprehensive sample of beach users. Additional data regarding the visitor country of origin was therefore not collected at visitor entry to the beach. Additional visitor numbers and entrance fee data were obtained from records held by SANParks, and visitation rates and annual revenue was calculated from August 2009, to July 2010.

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Tour Operators Survey

Tour operators who advertise visits to the penguin colony were interviewed telephonically, loosely guided by the questions in Appendix C. The survey was conducted to assess the importance of the penguin colony as a selling point of the tours. Respondents estimated the information; exact figures were not obtained. The surveys were conducted by a single interviewer during 8 – 9 November 2010.

Local Businesses Survey

Local business operators were interviewed to assess the impact, if any, of the penguin colony on their businesses. Businesses were chosen at random and classified into eating places, accommodation, curio shops, curio stalls, other shops (e.g. clothes shops, grocery shops etc.) and remaining types of business which were classified into 'other' (e.g. car garages, fuel stations etc.). Surveys were conducted in person or over the telephone by the same interviewer. The managers or owners of the businesses were surveyed where possible. Respondents were requested to estimate the proportion of their business attributable to the penguin colony, guided by the questions in Appendix D. Ten surveys were conducted directly around the Boulders area, 30 in Simons Town (less than 3km from the penguin colony), and ten in six of the surrounding towns (Glencairn, Fish Hoek, Kalk Bay, St James/Muizenburg, Scarborough and Kommetjie) until a point was reached where businesses considered the impact of the penguins to be negligible.

Statistical Analysis

Statistical analyses were conducted using SPSS (Version 14.0 2005). All continuous data were tested for normality using the Kolmogorov-Smirnov test. The non-parametric Mann-Whitney U test or the non-parametric Kruskal-Wallis was used depending on sample size. When data were in the form of counts, the Pearson's Chi-Squared test was used for analysis. The Yates's correction for continuity was used where appropriate.

User Survey Analysis

Visitors surveyed were split into three user groups; 'Cape Residents' (those that lived within the greater Cape Town area), 'Domestic Tourists' (South Africans visitors from outside of Cape Town), and 'International Tourists' (visitors from outside of South Africa). Where the

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boardwalk and beach respondents revealed similar patterns of answers, the data were grouped to maximise sample size. The analysis was complicated by the free pass that visitors to both the beach and the boardwalk have to each section. Some primarily beach users appear to also visit the boardwalk, and vice versa. The statistical analysis revealed that there was no significant difference between the first and second groups of survey responses conducted on the beach for the majority of the questions (Appendix E), and therefore, for the majority of the analysis of the beach-users data, the two groups were combined. The South African Consumer Price Index was used to calculate the current values of the monetary figures estimated in the 1995 study (Morgan 1996) to allow for an accurate comparison to money in 2010.

The standard entry fee for adults into Boulders was changed part way through the study from R35 to R40. This change in price could have altered the responses given by the visitors, as they were asked if they thought the gate charge was good value for money (Question 11, Appendix A). It could have also impacted the amount that they volunteer as maximum willingness to pay (Question 12, Appendix A), due to possible anchoring effects from the entrance fee paid (McElroy and Dowd 2007). There was no difference in what visitors considered to be good value before and after the entrance charge changed during the study (Pearson's Chi Squared test, $X^2 = 0.423$, $n = 357$, $d.f. = 1$, $P = 0.516$). There was also no difference in the maximum WTP before and after the entrance charge changed (Mann-Whitney $U = 14513.5$, $n = 357$, $P = 0.351$). The two groups were therefore combined for the analysis.

A travel cost analysis (TCA) was conducted to estimate the consumer's surplus of South African visitors. This is the measure of value that is of interest from a national welfare perspective. Five travel zones were created with different travel distance brackets from Boulders (ArcView GIS 3.3. Applegate 1992). The zones varied in shape and size due to

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geographical features and road layouts affecting the travel distances (Appendix F). Suburbs were assigned to each zone according to travel distances. The population size of each travel zone was then calculated according to the 2008 estimated suburb population sizes projected by the Strategic Development Information and GIS division from a 2001 census (Statistics South Africa 2001, Boot 2008). The study was restricted to Cape residents, as the sample size of domestic tourists was too low to produce reliable results, and the estimates of the importance of the penguins given by international tourists were unrealistic. Annual visitor numbers from each zone were estimated on the basis of the proportions of these visitors in the sample and the total numbers of visitors to Boulders.

The travel distance for each zone was calculated by averaging the three most common suburbs of travel origin within each zone. The travel cost was estimated using the cost per kilometre of road travel for a typical vehicle of average engine size (1800 Litres) as R3.50 per kilometre according to the Department of Transport tariffs for motor transport use (Department of Transport 2010). This cost includes fuel use, vehicle maintenance, capital, insurance cover, and depreciation. This cost was then multiplied by the average travel distance of each zone to calculate the travel cost (assuming that visitors took the shortest route to Boulders). The R35 entry price to Boulders was included into this travel cost as the majority of surveys were completed before the R40 entry fee was implemented. Accounting for time costs is often done by using the average hourly wage, but this is complex in a city with such a wide range of incomes. For this reason, time was omitted from the analysis and in this respect, values may be underestimates. However, the survey did not elicit car group size numbers and so this was not accounted for in the analysis. In this respect values provided by the travel cost analysis will be over estimates of actual values. These two contrasting sources of error will help to reduce the overall impact of the potential inaccuracy.

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A regression analysis was performed comparing the natural log of the annual visitation rates (per 1000 people in each zone) to travel costs. This equation was used to assess the effect of increased entrance fees on annual visitation rates (per 1000 people in each zone). The predicted visitation estimates were plotted against various entrance fee scenarios to produce a demand curve for Boulders. The area under the curve was thus the consumer surplus, or the net value of Boulders to visitors. To calculate the value, the equation:

$$CS = -e^{a+bTC} / b,$$

was used, in which *CS* is the consumer surplus, *TC* is the travel cost, *a* is the constant, and *b* is the slope from the travel cost regression. The consumer surplus was then divided by the number of Capetonian visitors to calculate the average value of Boulders per visitor. This value was then divided by the percentage of importance that the penguins had on the visitors' day trip (to disentangle value that could be attributed to other places visited that day on a multi-stop tour, or to users just visiting the beach, and not the penguins).

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RESULTS

Boulders Statistics

SANParks recorded a total of 519,200 visitors to Boulders over 2009/10. Visitor numbers have increased more than 1.5-fold over the past 15 years (Figure 3). International tourist arrivals contribute just over a third of all arrivals into the Western Cape (35%), and Domestic Tourists contribute 65% of arrivals. According to current visitation rates, Boulders captures over 28% of international arrivals, and under 1% of domestic arrivals. This is reflected by the relatively constant visitation rate of both the Western Cape and Boulders, and the fluctuating trend of the total visitation rates (Figure 3). International tourists are the most valuable to South Africa in terms of benefit to the economy; Boulders is therefore successful in capturing a high proportion of these 'valuable' visitors into the Western Cape. The gross revenue raised by entrance fees in 1995 was R720,000 (Morgan 1996), equivalent to R1.7 million in real terms in 2010. Over 2009/10, the gross revenue through entrance fees was R14.5 million; an 8.5-fold increase in nominal terms from the revenue earned at Boulders in 1995 (Morgan 1996).

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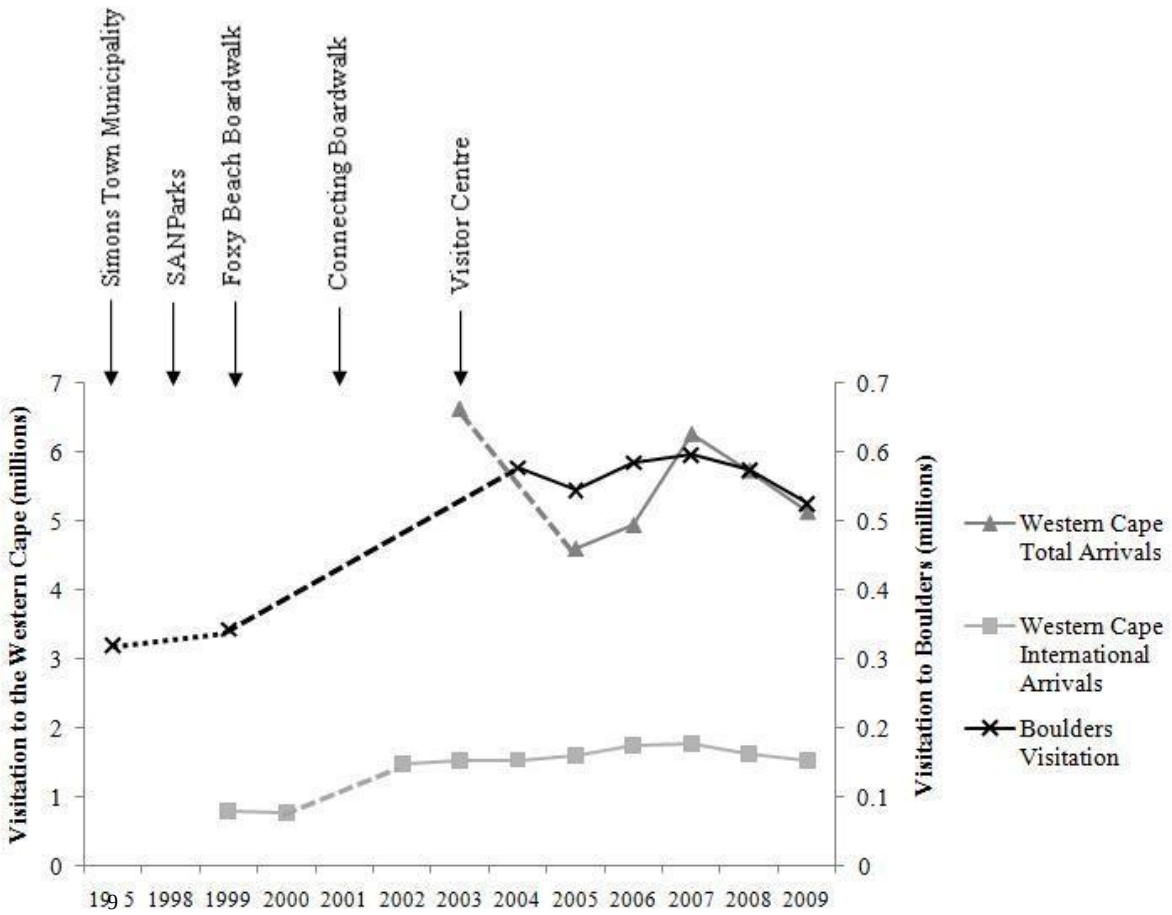

Figure 3. Changes in visitation to the Western Cape and Boulders, Simons Town over time, detailing significant changes and developments at Boulders (hashed lines showing missing data).

Origin of Visitors

A total of 300 questionnaires were completed on the boardwalk and 200 questionnaires were completed on the beach (100 conducted during January school holidays and 100 outside school holidays). Refusals to complete a questionnaire occurred in 11.2% of approaches. There was a large difference in composition of user groups on both the boardwalk and the beach, and the relationships between the groups have changed substantially since 1995 (Morgan 1996) (Table 1). The proportion of international visitors doubled from 44% in 1995, to 88.7% in 2010. There was a discrepancy between the origins of visitors according to data that was collected at random at the entrance gate, and the origins of the visitors that were surveyed on the

boardwalk. There was a significant difference in the sample between English and non-English speaking countries (Pearson's Chi Squared test, χ^2 = 7.15, *d.f.* = 1, *P* <0.01). The trend towards English speaking countries in the survey results can be explained by the intrinsic bias of the questionnaire being conducted in English, thus discriminating against non-English speakers. The UK, the US, and Germany were the most common country of residence of boardwalk users, and South Africa, the UK, and Germany were consistently the most common country of residence of those surveyed on the beach. The relative proportion of South African respondents increased from 48% to 76% outside and inside of school holidays respectively. A total of 39 different nationalities were surveyed in total (Appendix G).

Table 1. The composition of different user groups and the estimated annual visitation rates of visitors to Boulders, Simons Town. A comparison between data from 1995 (*n* = 300) (Morgan 1996) and 2010, detailing the boardwalk (*n* = 300) and the beach (*n* = 200).

User group	1996		2010			
			Boardwalk		Beach	
	%	*n*	%	*n*	%	*n*
Cape residents	34.7	111040	7.7	37818	50.0	23636
Domestic tourists	21.3	68160	3.7	18909	12.0	5673
International tourists	44.0	140800	88.7	416000	38.0	17964

User Statistics

The majority of visitors travelled to use the boardwalk at Boulders by car (60%, *n* = 180) or tour bus (35%, *n* = 105). Only 5% (*n* = 15) of visitors arrived on foot, or by taxi or public transport. All beach users that were questioned arrived by car, and no visitors on organised bus tours were questioned on the beach. Repeat visitors were more frequent on the beach than on the boardwalk (Table 2). The single significant difference between the first and second data

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collections on the beach was the number of visitors to Boulders that had been before: 40% of visitors surveyed before the school holidays had not been to Boulders before, compared to just 19% during school holidays. This reflects the greater proportion of Cape residents on the beach in school holidays (Table 1).

Table 2. Frequency of visits for users to the boardwalk and the beach (both before and after school holidays) at Boulders, Simons Town.

	Boardwalk		Beach (before holidays)		Beach (during holidays)	
Frequency of visit	*n*	%	*n*	%	*n*	%
Never	230	77	39	39	20	20
Less than five times	54	18	42	42	20	20
More than five times	16	5	19	19	60	60

The majority of boardwalk users (83%) were at Boulders solely for the purpose of seeing the penguins, compared with only 16% of beach users. Just 11% of the visitors to the boardwalk also planned to visit the beach. A fifth of beach users (21%, n = 41) went to Boulders to visit the beach alone, and 64% (n = 128) were at Boulders to visit both the beach and the penguins. Of those visitors that were at Boulders for the sole purpose of using the beach, 56% (n = 23) said that the penguins had a positive influence on their decision to use the beach, 41% (n = 17) said that they had no influence, and just a single respondent said that the penguins had a negative influence (2%). Boardwalk users spent an average of 70 minutes at Boulders, and beach users spent almost 2.5 times longer with an average visit length of 180 minutes.

Awareness of the Colony

Awareness of the existence of the colony has improved over the past 14 years for both domestic and international tourists (Pearson's Chi Squared test $\chi^2 = 65.629$, $d.f. = 2$, $P < 0.001$), although domestic tourists' awareness was higher than that of international tourists (Pearson's

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Chi Squared test $\chi^2 = 9.204$, *d.f.* = 2, *P* = 0.01) (Table 3). Of those visitors who were aware of the penguin colony before visiting Boulders, 31.5% said that the existence of the colony had been part of their reason for visiting Cape Town.

Table 3. Differences in visitor awareness of the Boulders colony of penguins between domestic and international tourists, and between 2010 (including the boardwalk and the beach data) and 1995 (from Morgan 1996).

User Group	Prior awareness of the existence of the colony			
	1995		2010	
	n	%	*n*	%
Domestic tourists	64	45.3	57	84.6
International tourists	132	43.2	306	69.6

Entry Payments

The majority of boardwalk users (94%) paid full entry price either through direct payment at the gate upon entrance to the park, or through payment to the tour operator. This contrasts with just 4% on the boardwalk, and 20% (*n* = 39) who entered the beach at lower costs by using their Wildcards (a pre-paid membership value system which allows entry into national parks and provincial nature reserves in South Africa). The remainder of users (5%, *n* = 2) were tour guides who entered the park for free. Only 11% of boardwalk users considered the entry fee to be poor value for money, and instead thought that R21 (geometric mean, range R0-30) would be a more reasonable entry fee. Over a fifth of beach users (23%) considered the entry fee to be poor value for money. Six of those users thought that there should be no entry fee to access the beach, and across those users that would like to see a lower fee, the suggested cost was also R21 (geometric mean, range R0-30).

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The maximum WTP for entry to the park was significantly higher in boardwalk users than beach users (Mann-Whitney U, U = 11760.0, n = 400, P = 0.001) (Table 4), so their responses were analysed separately. There was no significant difference in WTP between the three user groups on the boardwalk (Cape residents versus domestic tourists versus international tourists) either before or after information regarding the status of the penguin was provided (Kruskal Wallis test, first WTP question, χ^2 = 3.652, *d.f.* = 2, P = 0.161, second WTP question, χ^2 = 2.161, *d.f.* = 2, P =0.399). There was however a significant difference between user groups on the beach in both the first and second willingness to questions (Kruskal Wallis test, first WTP question, χ^2 = 16.02, *d.f.* = 2, P <0.001, second WTP question, χ^2 = 25.362, *d.f.* = 2, P <0.001).

Table 4. Geometric mean Willingness To Pay (WTP) of users of the boardwalk and the beach at Boulders, Simons Town, among Cape residents (CR), domestic tourists (DT), and international tourists (IT), and across all users. Results showing WTP both before and after information regarding the endangered status of the African Penguin was provided, the lack of visitor awareness of the status of the African Penguin, and the percentage of visitors that would change their WTP having learnt of the penguin status.

	Boardwalk visitors				Beach visitors			
WTP component	CR	DT	IT	All users	CR	DT	IT	All users
WTP before information	R47	R43	R51	R51	R43	R52	R50	R47
Unaware of penguin status	22%	46%	75%	70%	33%	25%	57%	41%
Information changes WTP	35%	55%	50%	49%	43%	54%	53%	48%
WTP after information	R56	R52	R62	R64	R47	R64	R62	R55
WTP above current entry fee	R16	R12	R22	R24	R7	R24	R22	R15

Awareness of the endangered status of the penguin was relatively poor, particularly amongst boardwalk users (Table 4). Almost half of all respondents (49%) increased their stated WTP after learning about the status of the penguins. Of those respondents, the geometric mean WTP

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after the information was R75 on the boardwalk, and R61 on the beach. WTP increased with information by 25% amongst boardwalk users, and 17% amongst beach users. The information had the least amount of impact on the Cape residents (an increase of R9 and R4 on the boardwalk and beach, respectively). The average WTP across all users was R49 per person (geometric mean) before information and R60 per person (geometric mean) following the information. Using the annual visitation rates, and the average WTP across all users, the current estimated total value of the Penguin colony is R26 million per annum (more than R11 million over the current gate revenues), with the potential to increase up to R31 million per annum (almost R17 million over the current gate revenues) with the provision of information regarding the status of the penguin.

South Africans' consumer surplus

There was a strong negative regression between travel costs and the annual visitation rates (R^2 = 0.90, Figure 4). People that live farther from Boulders visit less often, presumably largely due to travel costs. Based on the modelled demand curve, the consumer surplus was calculated to be R4.5 million per annum, with an average value per visitor of R32.33. When the visitors were asked what proportion of their reason for their day trip out they would attribute towards visiting the penguin colony, the average percentage given was 64%. Therefore, as some of the visitors were on a multi-stop tour, and others were at Boulders only to visit the beach and not the penguins specifically, the consumer surplus attributable to the penguin colony was R2.9 million, and the value per visitor was roughly R20. The value per visitor found by the TCA is less than what was found in a similar study conducted in 1995 (Morgan 1996) which estimated the value per visitor as roughly R28 in real terms (original value R11.27). Conversely, the current consumer surplus is considerably more than the 1995 estimate of R208,400 (original value R87,951).

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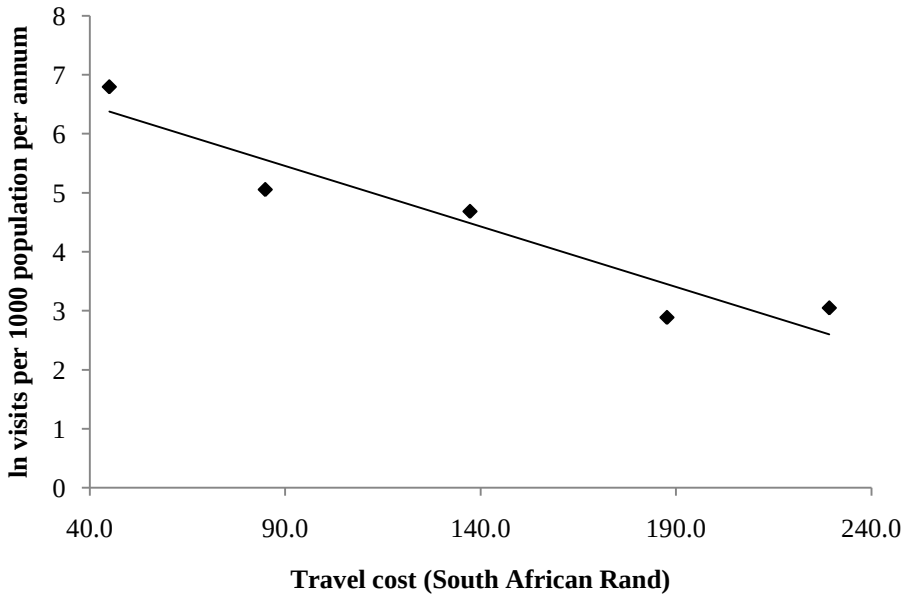

Figure 4. Relationship between visitation rate of Cape Residents to Boulders, Simons Town and the travel cost of visiting Boulders, including entrance fee (R35).

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Tour Operator Companies Survey

A total of 34 Cape Town-based tour operators were surveyed. The respondents considered October to February to be high season for tourism to Boulders, with low season from March to September. The average frequency of tours was 2.4 per week per company (geometric mean) during high season, ranging between just once a month for the smaller companies, and the larger companies visiting up to 28.1 times a week. During the low season there was an average visitation decrease of 65%, and some of the smaller companies stopped taking tours. The average number of guests per tour during the high season was 14.5 (3 - 60), dropping to 2.7 (1 - 9) during the low season.

Most tour operators (82%) considered a scheduled visit to the penguin colony on a multi-stop tour an effective selling point for tourists, with 66% of tourists joining tours specifically requesting to visit the penguins. Pricing strategy was either individually-based, or tourists were

charged for the hire of a tour vehicle. There was a large range in pricing throughout the different operators. Individually priced tours averaged R726 per person (R495 - R1800), and tours priced per vehicle averaged R2133 (R1950 - R2500). There was an average of 19.6 people employed across the 34 companies, although it ranged from a single owner to 200 employees in the largest company. The tour companies had been operating for 9.4 years on average, and 88% of the businesses were privately owned and run.

Local Businesses Analysis

A total of 100 businesses in eight towns were surveyed. There was a significant difference in the proportion of the business resulting from visitors to the penguin colony between the different types of business (Kruskal-Wallis $\chi^2 = 22.90$, $n = 98$, $d.f. = 5$, $P < 0.001$) (Table 5). The curio stalls appeared to benefit most from the penguins, but this could be an artefact of proximity to the colony as all of the stalls were within the Boulders or Simons Town area.

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Table 5. The different categories of businesses in towns along the southern Peninsula, Cape Town, and the mean proportion of trade that those businesses attributed towards visitors to the penguins colony at Boulders, Simons Town.

Type of Business	Mean proportion of trade	*n*	Mean distance from the colony (km)
Curios stalls	77.5	6	0.4
Curios shops	29.3	7	1.8
Other shops	27.5	22	7.3
Eating places	24.6	25	8.6
Accommodation	11.6	29	13.0
Other	6.8	11	6.2

The proportion of trade attributed to visitors to the penguin colony decreased with distance from Boulders (Kruskal-Wallis $\chi^2 = 36.79$, $n = 98$, $d.f. = 5$, $P < 0.001$) (Figure 5). The average

age of the businesses was 11 years (ranging 0.25-85 years, *n* = 95), and they employed 12.5 people (ranging from 1-200, *n* = 100) employed across all of the businesses. Most (87%) of the businesses surveyed were independently owned and run. When asked if there was any business advantage in operating close to the penguin colony, 47% of respondents (*n* = 47) said that there was an increase in business as a result of the tourists visiting Boulders. Only 14% of respondents reported some disadvantage of being close to the colony, such as the seasonal business of the visiting tourists, and the smell emanating from the colony (a problem only for businesses immediately adjacent to the colony). Kommetjie and Scarborough show the lowest proportion of trade attributable to visitors to the colony, perhaps a reflection of their position on the other side of the Peninsula, and not en route from Cape Town to the penguins.

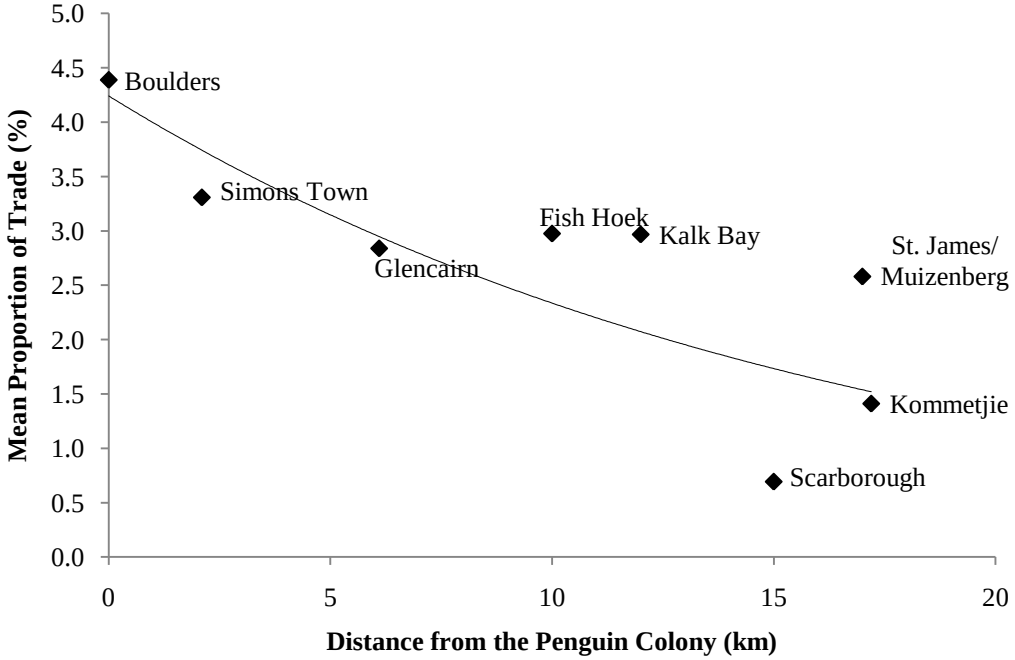

Figure 5. The effect of distance from the penguin colony at Boulders, Simons Town on the mean proportion of trade attributable to visitors to the penguin colony for businesses in towns along the Cape peninsula (exponential plot, $R^2 = 0.45$).

Total Value

The approximate value of the colony can be estimated from four different values. Firstly, the current revenue generated by SANParks at Boulders, the value to all users (according to the

WTP above current entry fees), the consumer surplus of the colony, and the value added to the economy. The current direct value of the colony is thus approximately R28 million, with the potential of increasing to R34 million with an improvement of visitor awareness regarding the Endangered status of the African Penguin. These values, however, do not include the consumer surplus of international and domestic visitors, and are thus an underestimate of the actual direct value. The indirect value of the colony (the impact on the economy) could not be established as the total gross revenue across the peninsula is unavailable.

The study by Morgan (1996) estimated the total value of the colony to be between R5 and R7 million (R1.2 million and R1.5 million respectively in original values from 1995). These are overestimates of the total value in 1995, as the annual totals were extrapolated from values calculated in the high season. However, these values did not include the value to users according to their willingness to pay. As such, the value of the colony (excluding the users' value discovered in this study) has increased by at least R10 million in real terms, over double its value 15 years ago.

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DISCUSSION

Visitor Trends

There has been considerable investment in tourism infrastructure at Boulders, which has allowed the area to cope with the increasing number of visiting tourists over the past two decades (Figure 3). Indeed, these investments are probably part of the cause of the increase in visitor numbers. Boulders is renowned as an ecotourism destination, and as such, it is imperative that the large numbers of visiting tourists do not negatively impact on the penguins. Research has suggested that, in order to negate impacts to wild bird populations, visitor numbers should be restricted (Yorio et al. 2001). Different seabird species, however, show different sensitivity to humans (Yorio et al. 2001); thus, adverse effects on the penguins may be minimal (Nisbet 2000). The development of the boardwalk at Boulders allows for the viewing of penguins by tens of thousands of tourists each year. Human presence can have a negative impact on the welfare of birds, as has been discovered with some penguin species (Carney and Sydeman 1999; McClung et al. 2004; Ellenberg et al. 2006; Ellenberg et al 2009), including the African Penguin (Seddon and Ellenberg 2008). However, regularly visited African Penguins have been found to habituate to human disturbance (van Heezik and Seddon 1990), and the penguins at Boulders appear to suffer no negative impact from the presence of the tourists, as has been recorded with other penguin tourist attractions (Carney and Sydeman 1999; Giling et al. 2008).

The change in the composition of users (Table 1) supports the global trend in the growth of international tourism. The proportion of Cape residents and domestic tourist visitation has decreased 4.5 and 5.8 fold respectively (Table 1) over the past 15 years. Conversely, the proportion of international tourists has doubled over that same period. These trends are mirrored in the data found by Statistics South Africa; international tourist arrivals into the

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Western Cape increased by almost 200% over a ten year period (from 790,000 in 1999, to 1.5 million in 2009) (Cape Town Routes Unlimited 2010) (Figure 3). Domestic arrivals to the Western Cape decreased by 25% over an 8 year period (from 4.2 million in 2001, to 3.6 million in 2009) (Cape Town Routes Unlimited 2005, Cape Town Routes Unlimited 2010). These data, however, suggest that the composition of visitors to Boulders differs from the composition of visitors to the Western Cape, and proportionately, Boulders receives more international tourists. This is a positive trend in terms of maximising revenue from visitors, as international tourists are the most valuable to the South African economy.

The difference in the composition of users between the beach and the boardwalk highlights the difference in appeal between the two facilities; the boardwalk has a primarily international market, and the beach has a primarily local market and attracts mostly Cape residents. The greater number of visitors to the boardwalk than the beach (pers. comm. Monique Ruthenberg, SANParks, 07.02.2011), and the shorter time spent by boardwalk users, indicates that there is a far higher rate of turnover at the boardwalk. The latter thus contributes substantially more than the beach to the overall revenue raised at Boulders. The discrepancy between the composition of visitors according to the data collected at the gate, and the country of residence of those surveyed, suggests a bias towards English speaking countries. The country of residence of those users that refused to be surveyed could not be ascertained. However, it is likely that the majority of refusals were due to the respondents feeling uncomfortable speaking English. The apparent bias could thus be attributable to a trend in refusals.

Public awareness of the existence of the colony has considerably improved over the last 15 years for both domestic and international tourists. As the colony grew in size and Boulders became more of an established ecotourism destination, the marketing of Boulders improved,

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and a visit to the penguin colony is now one of the major tourist attractions of Cape Town. Almost a third of those visitors who knew of the existence of the colony prior to their visit to Cape Town said that the penguins were a part of their reason for visiting the city. It has been found that in order to maximise the economic benefits of tourism, developing countries should focus their effort on improving consumer awareness (Hawkins and Theobald 1995). The marketing of ecotourism destinations to international tourists is a complex but essential component of their success (Björk 2000). If the domestic and international awareness of the existence of the colony were to be improved through increased marketing, there could be a resultant increase in the number of visitors (and revenue) to Boulders, to Cape Town, and perhaps even to South Africa as a whole.

Value of the Colony

The higher WTP found amongst the boardwalk users may be because many of the beach users were at Boulders purely to use the beach, and the majority of South Africa's beaches are free of charge. Some beach respondents even suggested that there should be no entrance fee to Boulders, whereas none of the boardwalk users expressed this opinion. The user WTP before they were given any information on the status of the penguin was higher than the current entry fee for both the boardwalk and the beach users. These results suggest that Boulders could hypothetically increase the entrance fee up to R47 (Table 4) without needing to invest in any changes to the facilities, and while the visitation rates might decrease, total revenue to Boulders could increase (depending on the exact decrease in visitation rates).

The current awareness of the endangered status of the penguin was poor, particularly amongst boardwalk users; perhaps a reflection of the user group being mostly international. Almost half of the world's population live in urban areas and are increasingly disconnected from the natural

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world (Miller 2005). Public awareness of conservation issues has thus been found to be poor (Ballantyne et al. 2008; Sampei and Aoyagi-Usui 2009), and awareness levels are thought to impact the attitudes that people hold towards such issues (Kellert 1994). The amount of conservation support that a species receives is thought to be related to the public knowledge (or lack thereof) of that species (Tisdell and Wilson 2008). This could explain why the provision of information increased the WTP for approximately half of the users.

The Cape residents group was least affected by the information, which could be explained by the fact that Cape residents were the majority of beach users (Table 1), and were thus primarily at Boulders to use the beach and not because of a high interest in the penguins (perhaps as a result of familiarity with the species). The WTP following information about the status of the penguin increased most amongst the international visitors to both the beach and the boardwalk. The amount that visitors would be willing to pay above the current entrance fee is quite considerable with an increased awareness. The media is found to be an influential tool for improving public awareness of environmental issues (Huang et al. 2010; Arlt et al. 2011). If SANParks were to invest in promoting awareness regarding the endangered status of the African Penguin through, for example, the media, annual revenue into Boulders could be far greater. As a result, more resources could be put towards both the facilities at Boulders (with a possible further increase in visitation rates), and the conservation of the penguins, both at Boulders and at other colonies.

A study by Martín-López et al. (2008) revealed that visitor WTP to view wildlife was affected by a wide variety of factors. Species with anthropomorphic and anthropocentric characteristics are generally valued highest (Martín-López et al. 2008). The economic impact of the species, the use versus the non-use value, and the level of endangerment were also affecting factors

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(Martín-López et al. 2008). According to these interacting factors, penguins could perhaps be predicted to receive a high visitor WTP. Results of WTP studies, however, appear to be unpredictable. The Asian Elephant, *Elephas maximus*, a relatively charismatic species (although this is subjective), has a mean value per person of just R14 (Bandara and Tisdell 2003; Bandara 2004; Bandara and Tisdell 2005). The Chinook Salmon, *Oncorhynchus tshawytscha*, on the other hand, a comparatively uncharismatic species, has a mean value of over R900 per person due to sport fishing (Olsen et al. 1991). The value of the penguins is thus relatively low compared to certain species, and it is clear that the factors behind visitor WTP are complex and can result in unpredictable valuations.

The large increase in consumer surplus over the past 15 years (as revealed in the travel cost analysis) indicates an increase in the recreational value of the penguins to South African visitors. This can be explained by the huge increase in visitor numbers to Boulders, from 320,000 in 1995 to 520,000 in 2010. The consumer surplus of Boulders does, however, appear to be considerably less than other ecotourism destinations (Carr and Mendelsohn 2003; Gürlük and Rehber 2008). The Great Barrier Reef for example, has a domestic consumer surplus of almost R3 billion per year. However, considering its small size, and relative youth as an ecotourism destination, the Capetonian consumer surplus of Boulders is quite considerable. By including the consumer surplus of domestic tourists and international tourists into the current Boulders value, there would be a resultant increase in the overall consumer surplus, and as such, Boulders is clearly a valuable tourist destination.

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Comparison of Valuation Methods

The contingent valuation method reveals a greater value for the penguins per visitor than the travel cost analysis. The TCA, however, was conducted only for Cape residents as the sample of domestic tourists was so small, and international tourists were not analysed due to the complex nature of multi-destination trips. The TCA can, therefore, most realistically be compared to the Cape residents group in the CVM. The TCA estimated an approximate value of R21 for the beach and the boardwalk collectively, and the CVM revealed a WTP of R21 and R12 for the boardwalk and beach respectively. The values from both types of valuation techniques are similar, and thus arguably prove the validity of both methods. There are, however, potential sources of error in both methods.

The CVM has been heavily criticised, and there is continuing debate amongst economists, government, and environmental bodies, over the reliability of its use as an environmental valuation technique (Chapter 1) (Portney 1994, Carlsson and Martinsson 2001). Despite the potential downfalls, CVM approach can be a very useful tool for valuation studies, and it has been argued that their future application in public policy formation is unavoidable (Portney 1994; Carlsson and Martinsson 2001). The potential sources of error (Chapter 1) could have lead to an overestimate of what visitors claim they would be willing to pay. These factors may be a cause for concern in the use of the CVM when the results of such studies are used in policy recommendation (Alberini 1995). Implementing an increased fee according to the results of the CVM, for example, risks losing a high proportion of visitor numbers, as in reality, users may not be willing to pay as much above the existing entry fee as they claim.

The TCA uses a revealed preference technique, i.e. it estimates value through observation of behaviour, and is thus perhaps more robust than the CVM. However, in calculating the

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population of each travel zone, the figure of all residents within each suburb was used, thus including all socioeconomic brackets. Through observation, the visitors to Boulders did not cover wide socioeconomic backgrounds. For example, there was unlikely to be a high proportion of unemployed visitors with adequate disposable income to cover travel costs and entry fees. This factor could have provided an underestimate of the value per visitor to Boulders. The zonal approach also does not allow for differentiation in cost between individuals, and instead assumes that everyone from a given zone had approximately the same travel costs. The TCA also did not consider time costs incurred by visitors due to the complexity of estimating those costs (often based on average hourly wages) in a city with such a wide range of incomes. For this reason, time was omitted from the analysis. As with the CVM, the TCA also assumes consistency between individuals in the socioeconomic bracket of the visitors. This problem can be solved only by obtaining details about the income of the visitors; a sensitive issue to raise in a questionnaire survey, and thus this subject was not included in the analysis and could be a potential source of error.

Local Impact of the Colony

Much of the high season for tour companies occurs during penguin moulting season (November to January) (Underhill and Crawford 1999) when their activity is low, and from a tourism stance, penguin viewing may be least appealing. The high regularity of tours suggests a constant flow of tourists, and thus the appeal of the tour destinations must be high. Penguins were reported to be the major selling point of the tours, and so potential disappearance of the colony would likely result in a considerable drop in visitors on the tours, and a possible resultant decrease in existing tour companies. A drop in numbers on the peninsula tours would also ultimately cause a drop in visitors to other destinations on the peninsula, including Cape Point (also under SANParks management). Consequentially, there would not only be a

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reduction in income to SANParks through Boulders, but also a possible decrease in income to SANParks through Cape Point.

The existence of the colony had the most impact on curio sales compared with any other type of business. The majority of curio stalls and shops, however, were in the immediate surroundings to Boulders, and this trend could be a result of proximity to the colony. Eating places benefit more from the colony than sources of accommodation because the majority of visitors to the peninsula and to Boulders appear to be on day trips from the Cape Town area, and thus, while they are likely to stop for food during their day, few people require accommodation. The existence of the penguins had a greater impact on businesses in towns that were closest to the colony than those further away. In spite of this, towns such as Kommetjie, over 17 km from the colony, still attributed some of their business towards visitors to the penguin colony. The results highlight the economic impact of the colony, not just in the immediate surroundings, but across the entire peninsula. If the colony were to become extinct, the majority of visiting tourists would have little reason to stop at Simons Town on their way to Cape Point, and so the economic advantage of increased tourists could largely be lost.

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There are successful tourism destinations of various penguin species around the world (Fraser and Patterson 1997; Fowler 1999; Otley 2005; Busch and Cullen 2009). It is thought that there are two factors that explain the popularity of penguin tourism; the fact that the birds come ashore for extended periods of the year to breed, and their general demeanour which appeals to human recreational enjoyment (Seddon and Ellenberg 2008). The success of Boulders as an ecotourism destination is therefore unsurprising due to the easy accessibility of the colony, and the nature of the penguins. There are two other colonies of African Penguin that are accessible from Cape Town. The mainland colony of Stony Point, Betty's Bay, is a relatively unknown

colony when compared to the popular attraction of Boulders on the opposite side of False Bay, although it shares many of the characteristics of the Boulders colony. As a mainland colony with reasonable road access, Stony Point has the potential to rapidly increase the incoming revenue with relatively little investment into infrastructure. There is also a nearby colony at Robben Island, to which regular boat trips depart from Cape Town for visitors to the old prison. Viewing infrastructure already exists at the colony, although the penguins are currently not included in the existing island tour. The success of the development of ecotourism at Boulders could be used as a case study for development at other colonies. With careful planning and sensitive development, there is substantial unrealised potential for further revenue to be earned from the tourism of the African Penguin. By investing into the ecotourism of these additional colonies, there could be a marked increase in the amount of funding available to the conservation of this endangered species.

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CHAPTER 3

Attitudes of the Local Residents and Visiting Tourists to Boulders: Implications for Management

INTRODUCTION

Boulders in Simons Town, Cape Peninsula, is a unique and important site in several regards. Boulders is home to a colony of the endangered African Penguin. It is also a site that is completely surrounded by urban development, and traditionally frequented by recreational beach visitors. Indeed, there has been human settlement in Simons Town since the late 17th century, and it is thought that people have been using the beaches since this time (pers. comm. Cathy Salter-Jansen, curator Simons Town Museum). The arrival of the penguin colony, however, was just 25 years ago. This temporal pattern is uncommon amongst many endangered species, as often the cause of the poor conservation status of species is the habitat destruction through human encroachment and development (Tilman et al. 2002). Boulders is now a major ecotourism destination generating millions of Rand in revenue each year (Chapter 2). The substantial change in the nature of Boulders has thus occurred over a relatively short period of time.

Good Relations

The first pair of penguins bred at Boulders in 1985, and the colony grew at a rate of around 60% per annum in the following few years (Crawford et al. 2000). The population in 2010 was around 940 breeding pairs (pers. comm. Monique Ruthenberg, SANParks 02.02.11). Despite the establishment of the colony being a positive step for the world population of African Penguins, there was some controversy over its formation. The Boulders coastline has several

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small beaches, and the penguins soon inhabited most of these for breeding purposes. Prior to the arrival of the penguins these beaches were used for human recreational purposes, particularly by the local residents of Simons Town. Not only did the penguin arrival (and subsequent entry charge) onto what was once a free-access beach irritate many of the local inhabitants, but the associated noise and smell of the penguins caused further annoyance (Morgan 1996). The arrival of the penguins also attracted the attention of the tourism industry, and the visiting tourists soon came in their thousands, further impacting on residents. Penguins also colonised gardens of the surrounding houses, causing damage, and also causing annoyance to the residents. A study conducted in 1995 (Morgan 1996) revealed animosity from some residents towards both the penguins and their management under the Simons Town Municipality (the original managing body).

In an attempt to satisfy the wishes of the local residents, and simultaneously aid in the protection of the colony, the Simons Town Municipality erected a penguin-proof fence in 1996 to confine the penguins to the coastal strip. South African National Parks (SANParks) then took over management of the area in 1998. A penguin viewing boardwalk was then erected over Foxy Beach in 1999 to minimise human disturbance to the penguins, and a visitor and information centre was developed so that the increasing numbers of visiting tourists could be better managed and provided with information on the penguins. SANParks realise the importance of both satisfying the requirements of the local residents and creating the best scenario for the penguin colony to ensure their future existence (pers. comm. Monique Ruthenberg, SANParks, 07.02.2011).

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Ecotourism Destination

Boulders is now a highly popular ecotourism destination and one of the largest avitourism ventures throughout the whole of South Africa (Department of Trade and Industry 2010c). As with other ecotourism ventures, Boulders aims to benefit the natural resource attraction, i.e. assist with penguin conservation, while maximising visitor satisfaction. African Penguin conservation efforts include the establishment and maintenance of artificial nest boxes (to offset habitat degradation from burrows), predator removal (such as feral cats and Cape Fur Seals), intervention during oil spills, and the closure of purse-seine fishing areas surrounding penguin colonies, such as in False Bay by the Boulders colony (African Penguin Biodiversity Management Plan, 2010). Each of these conservation efforts requires considerable funding, and thus, in order to assist with penguin conservation, it is imperative that SANParks maximise revenue from Boulders. This can be achieved through an economic assessment of costs and revenues at Boulders, or through maximising visitor satisfaction in an attempt to increase revisits and increase visitor numbers through recommendations and word of mouth.

This chapter assesses the attitudes of the local residents towards the penguins and their management by SANParks, and explores how those attitudes have changed since a similar study was conducted 15 years ago (Morgan 1996). It also assesses the attitudes of the visiting tourists, and identifies where the visitor experience could be improved, with the ultimate objective of maximising revenue into Boulders.

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METHODS

Local Residents Survey

A door to door survey was conducted in the local houses around Boulders in November 2010. The questionnaire (Appendix H) was designed to elicit details of the residents (including details of the duration of their residency), and their attitudes towards the penguin colony and its management. Survey collections were split into houses within a 300m radius of the penguin colony below the main road from Simons Town to Cape Point (a possible barrier to penguins), and houses between 300m and 600m of the penguin colony (above the busy road). Each house that appeared empty upon the first visit was revisited on a different day, and if the house remained empty, it was assumed to be unoccupied. Records were kept of any refusals that were given.

Boulders Users Survey

A survey was conducted to users of the beach and the boardwalk between 12 October and 15 November 2010 (Chapter 2, Appendix A). Further surveys were conducted on the beach 6-7 January 2011 to ensure a comprehensive sample of visitors, both during and outside school holidays. The survey was designed for two purposes; a valuation study of the penguins (Chapter 2), and to gather information regarding visitor opinions and attitudes towards their experience at Boulders. Specifically, the questions were designed to discover the users' methods of payment, and the attitudes of the users towards the entry fees (Appendix A). The survey also elicited the effectiveness of the education provided by SANParks at Boulders regarding the African Penguin and its endangered status. Finally, the survey asked what changes users suggest might improve their visit or experiences at Boulders.

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Statistical Analysis

Statistical analysis was conducted using SPSS Version 14.0 (2005). There was no significant difference in the responses of the residents above and below the main road, and so the data was pooled (Appendix I). Residents' attitudes towards listed factors associated with living close to the colony were scored from one to five (1 = 'I really like it', 5 = 'I hate it'). The scores were averaged for each factor, and the range of scores was obtained.

The suggested improvements by Boulders users were categorised and analysed using Pearson's Chi-Squared test to identify statistical significances. A scoring system was used to identify the order of importance for the suggested improvements by the Boulders users. The suggested improvements were allocated into eight different categories. The respondents gave up to three suggested improvements in order of importance (the first suggestion was the most important). These improvements were allocated a score; first suggestions were scored 3, second suggestions were scored 2, and third suggestions were scored 1. The scores for each of the eight categories were totalled across all three suggestions.

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RESULTS

Local Residents Survey

A total of 67 houses were approached. The majority (34) of houses approached were vacant, probably due to the time of year that the surveys were conducted. Seven households refused to complete a questionnaire. A total of 26 questionnaires were completed; 16 below the main road, and ten above. The majority of the respondents (n = 20) were permanent residents, four were holiday home owners, and two were in rented houses on holiday. The holiday home owners spent an average of 58.5 (24-90) days per year in their residence, and both the holiday-rental visitors were staying for seven days. The home owners (including permanent residents and holiday home owners) had owned their properties for an average of 13.6 years (6 months to 57 years).

The study conducted by Morgan (1996) revealed some very strong opinions amongst the local residents regarding the penguin colony at Boulders, and its management at the time under the Simons Town Municipality. Just six of the respondents in this study had owned properties at Boulders for 25 years or more, i.e. since before the arrival of the penguin colony. The overall impression of animosity has largely faded today when compared with 15 years ago (Morgan 1996). The reduced strength of opinion may be attributable to the fact that the previous residents no longer live in the area, and the newer residents moved to the area in the knowledge that their property is near a penguin colony and popular tourist attraction.

In 1995, the majority of residents (11 out of 12) claimed to visit the beach at least once daily. The visitation rates in 2010 varied according to the entry payment (Figure 6). None of the respondents used the paid beach more than 12 times per year, instead using other local beaches free of charge and not under SANParks management. The majority of those residents who

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owned their houses before the entry payment was implemented stated that they also had previously used Boulders Beach regularly when entry was free. The majority of respondents (65%) said the penguins had no influence on their decision to live or holiday in the property, and 15% said that the penguins had a positive influence. One fifth of respondents (19%) said that the penguin colony had a negative impact on their decision to live or holiday in the property, despite best efforts by SANParks to minimise the negative impacts of the colony on local residents. When the residents were asked to give their opinion on a series of factors related to living in such close proximity to the penguin colony, the character of the penguins and having access to a rare species were the most preferred factors, and the loss of amenity of the beach and the smell generated by the penguins were the greatest annoyances (Figure 7).

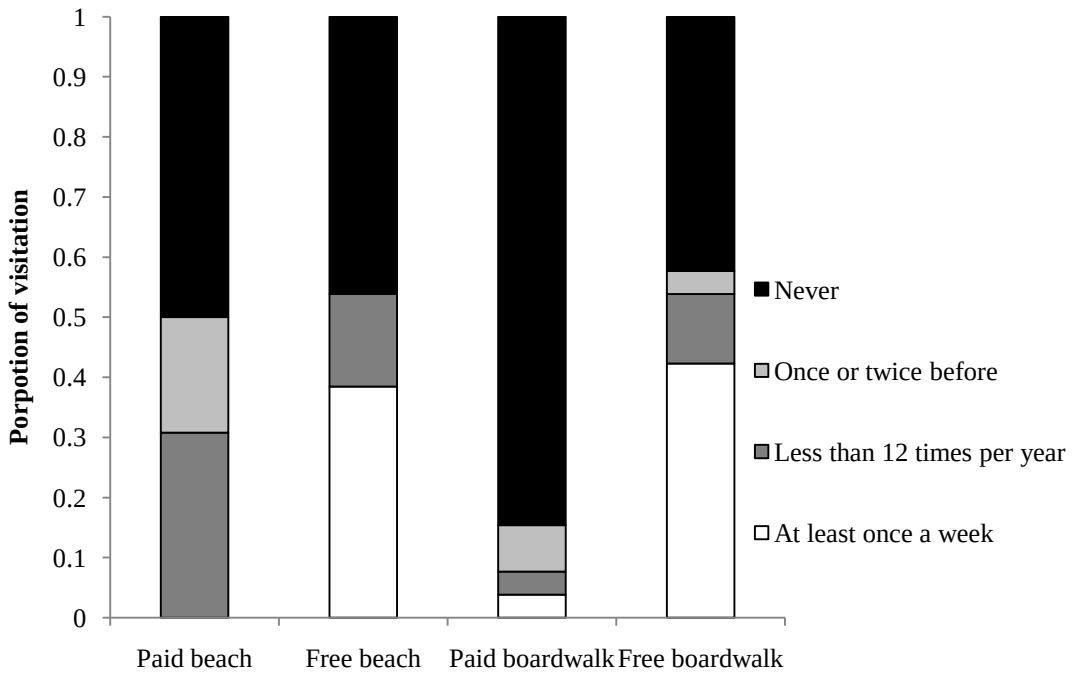

Figure 6. Proportion of visitation rates of local residents into the facilities surrounding Boulders, Simons Town, including Boulders Beach (paid beach), the penguin viewing boardwalk area over Foxy Beach (paid boardwalk), the local open access beaches (free beach), and the open access section of the boardwalk inland of Boulders Beach (free boardwalk).

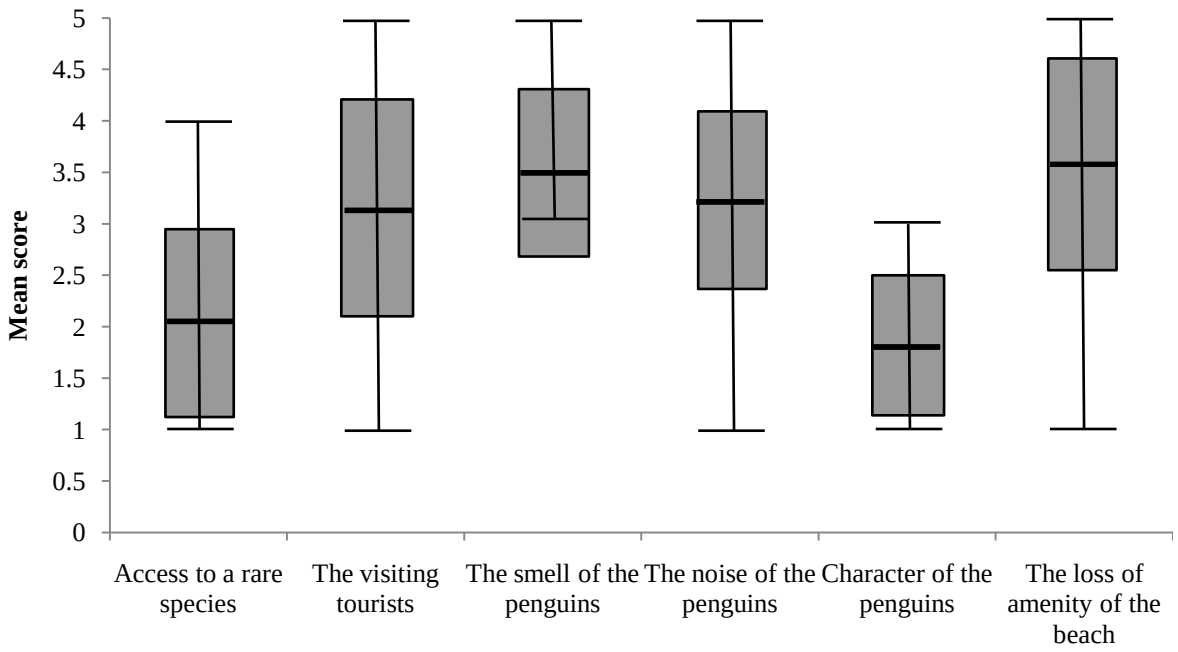

Figure 7. Factors associated with living in close proximity to the penguin colony at Boulders, Simons Town, according to the opinions of the local home owners (both permanent residents and holiday home owners) and the holiday visitors. Figure details mean score (central bold lines), standard deviation (shaded bars), and range of scores (fine vertical lines).

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Most of the respondents (64%) were highly concerned about the endangered status of the African Penguin; seven of the respondents (28%) said that they were a little concerned, and just two of the respondents (8%) said that they had no concern at all. Some respondents commented that they were unaware of the endangered status of the penguin, and that conservation agencies should be working harder to prevent further species from going extinct. Conversely some respondents commented that it is just a single species at risk and efforts should be spread over protecting many species, and that the loss of the African Penguin will not have any major detrimental effects on any other species.

Twenty of the respondents were aware that the Table Mountain National Park (SANParks) took over management of Boulders from the Simons Town municipality, suggesting a high interest

and awareness in the management of the area. Despite this, ten of the respondents did not have an opinion on whether matters had improved or worsened since the change in management (although noticeable changes were acknowledged by some respondents). Four of the six residents who lived in Boulders prior to the arrival of the penguins considered the management of the area to have worsened since SANParks took control of Boulders. A total of six respondents considered matters to have worsened, and commented that the penguin nest boxes that were implemented look ugly, original agreements over residents' use of the beach were not adhered to, and SANParks can take too long to respond to reported problems and occasionally allow the beach to get dirty. However, four respondents considered matters to have improved since the change in management, and commented that SANParks help to avoid some problems, such as penguins trampling vegetation in gardens. Further comments made by the local residents commented on areas in which SANParks have succeeded, and suggested some improvements that they would like to see implemented by SANParks (Table 6).

Entrance to Boulders

Just 4% of visitors to the boardwalk used a Wildcard for entry. The majority of boardwalk users had never even heard of the Wildcard prior to their visit to Boulders (74%), although 6% of users learnt of its existence upon entry to the park. Comparatively more beach users (20%) entered the park using a Wildcard, and most beach users (61%) knew about the Wildcard, possibly reflecting the higher proportion of local and South African tourists among beach users (Chapter 2). Just 4% of beach users learnt of the existence of the Wildcard upon entry to the park. The mode of entry payment was significantly different across the Cape residents, domestic residents, and international tourists within both the beach and the boardwalk groups (Pearson's Chi Squared test $\chi^2 = 87.105$, $d.f. = 4$, $P < 0.001$). The domestic tourists used Wildcards the least, and were least aware of its existence.

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Table 6. Suggested improvements and points of success of the management of Boulders, Simons Town according to the local residents.

Points of success	*n*
The local economy benefits from increased tourism	3
The implementation of the boardwalk was successful	2
SANParks staff are very helpful	1
Suggested improvements	*n*
Allow free access to the beach for local residents	5
Prevent penguins from accessing residential areas and roads	4
Improve signage to slow traffic and warn of penguins crossing	2
All dogs must be walked on leashes	2
Improved signage to prevent people from harassing the penguins	2
Consult a public advisory committee before making decisions	2
Relocate the penguin colony	2
Improve responsiveness to problems and complaints	1
Increase the space available to the penguins	1
Control tourist parking (avoid obstructing residents' driveways etc)	1
Prevent penguins from spreading along the coast	1
Improve educational material on penguins	1
Beach is overcrowded, numbers should be controlled	1
Increase areas for dog walking	1
Improve care and rehabilitation of indigenous vegetation	1

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The contingent valuation study revealed that users of Boulders would be willing to pay additional entrance fees to Boulders if they knew about the endangered status of the African Penguin (Chapter 2). Most boardwalk users (70%), and 41% of beach users were unaware of the endangered status of the African Penguin. Just 30% of boardwalk users that did not previously know about the penguin status had learned about it during their visit to Boulders, and even fewer beach users learned of the penguins' status during their visit (9%). These

results suggest that SANPark's methods of conveying information to the tourists were relatively ineffective, and if it were to be improved, revenue into Boulders could benefit as a result.

Almost a tenth of all respondents (8.8%) would have been willing to pay higher entrance fees if it had been made clear upon arrival that the payment would be going towards conservation of the penguins. Some respondents (3.2%, n = 16) said that the gate fee should not be any higher than it was, but they would be willing to make a voluntary donation towards the penguins if given the option. Eight respondents (1.6%) would not pay extra as they already support other conservation agencies. Three respondents (0.6%) said that they would not be willing to pay additional entry fees as they felt that the money they had paid was adequate for penguin conservation. Some of the respondents (2.8%, n = 14) felt there should be different entrance fees for locals and international visitors, and 1.2% (n = 6) thought that higher entrance fees would prevent people from coming.

User Survey Opinions

User reasons for visiting Boulders differed between the beach and the boardwalk (Pearson's Chi-Squared Test χ^2 = 148.0, n = 473, $d.f.$ = 8, P <0.001). The main reason for visiting the boardwalk was penguin viewing (Figure 8). Reasons for visiting the beach were varied and mostly spread between penguin viewing (the primary factor), the beauty or atmosphere of the beach, the beach itself, and its suitability for children and families in terms of safety and enjoyment (Figure 8). Of those visitors that said the penguins were the favourite aspect of their visit to Boulders, 89.9% were referring to penguins in general, 6.2% said that they specifically liked the close proximity of the penguins, and 3.9% said that they liked to see the penguins in their natural environment.

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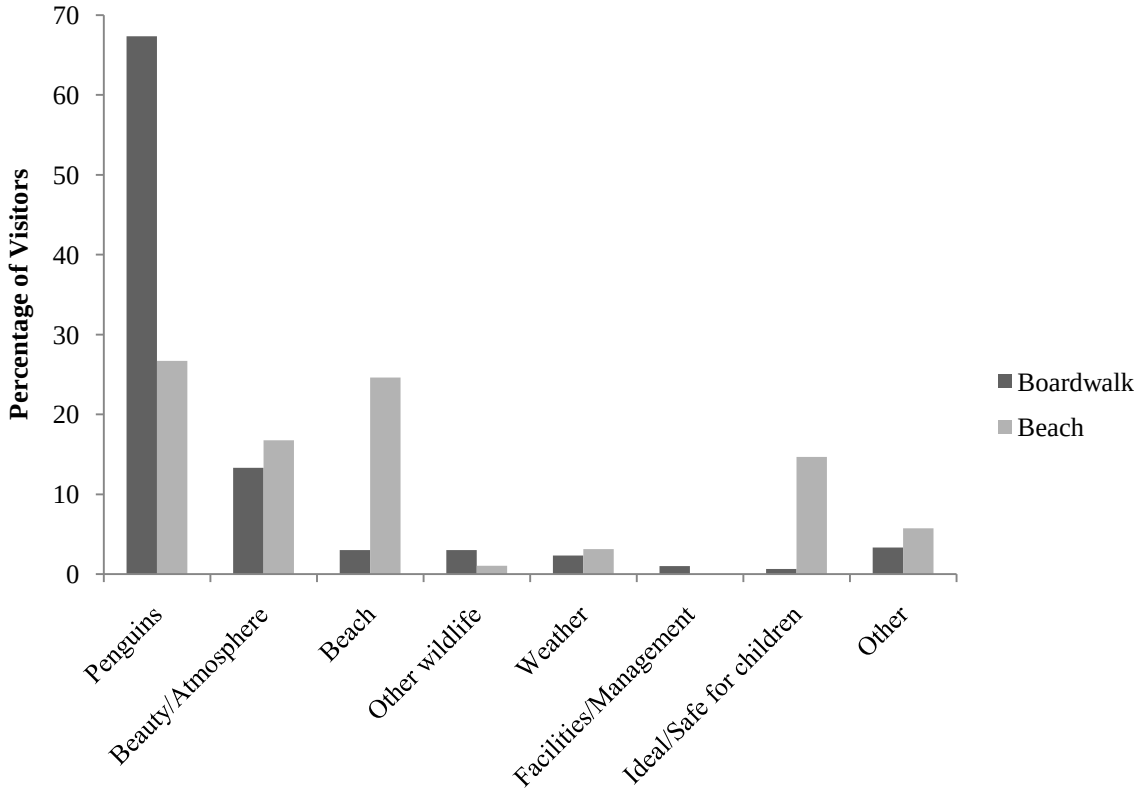

Figure 8. The favourite aspects of Boulders, Simons Town, according to the visitors of both the boardwalk and the beach.

The responses provided by the users for suggested improvements were grouped into nine categories. The primary suggestion by boardwalk users was more information on the biology, status, and threats to the penguin (Figure 9). An increase in penguin numbers and penguin activity, and an improvement in weather conditions were also commonly mentioned as aspects where the boardwalk users' visits could have been improved. Aside from the 'Other' category, improved signage was the primary suggested improvement by beach users, both for improved directions (in getting to Boulders and navigating around the park), and for more apparent rules on the beach, for example, no smoking signs, and signs to prevent people from harassing the penguins. Improved facilities, such as the provision of shade (through umbrella rental for example) and a fresh water tap on the beach, were also commonly suggested by beach users.

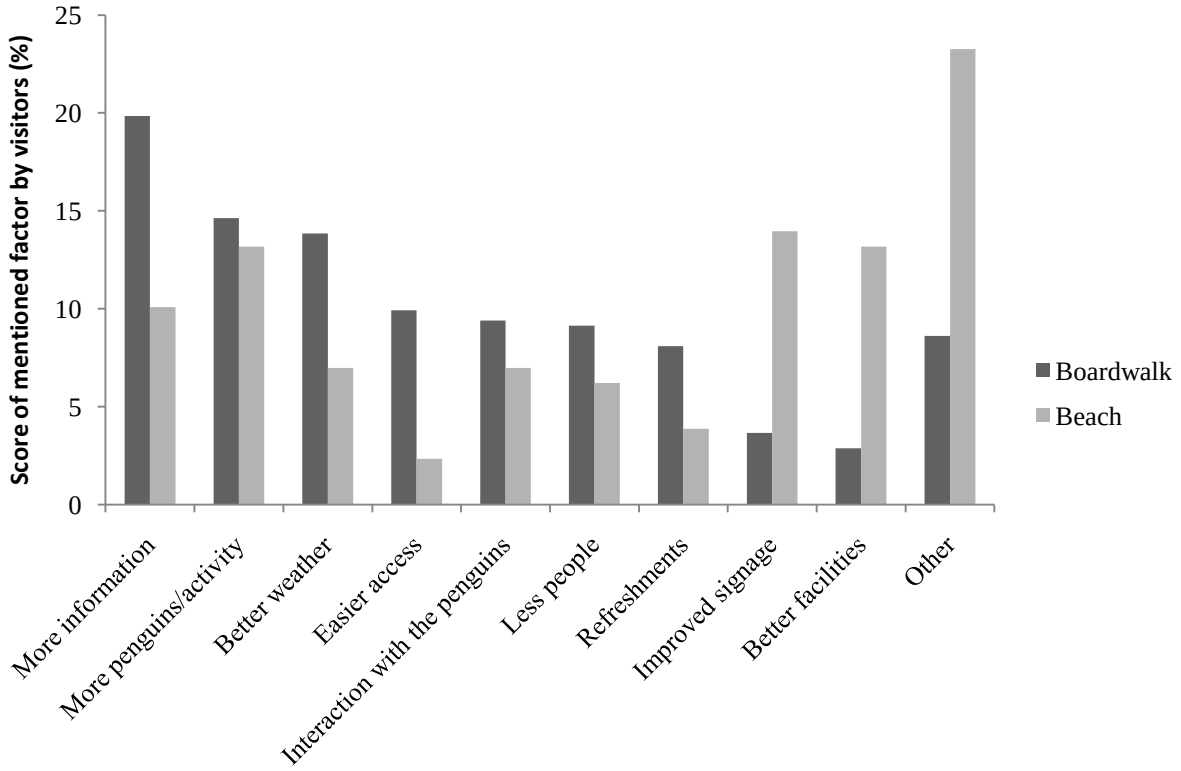

Figure 9. The suggested improvements by the visitors to the boardwalk and the beach at Boulders, Simons Town.

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DISCUSSION

Local Residents

In 1995, prior to SANParks taking over management of Boulders, the residents were keen for the coming change. The majority of today's respondents were aware of the change in management in 1998, despite the fact that many of the residents were not living in their houses at the time, suggesting that the residents' interest in the management of the colony has remained. Despite the previous hopes of the residents that the arrival of SANParks would improve some issues at Boulders, six of the residents considered matters to have worsened since the change in management, and just four respondents considered matters to have improved.

Many native species are not successful in an urban habitat (Caro and Sherman 2011). Indeed, urban expansion is typically the cause behind the endangered status of many threatened species (Sheridan 2007), and often the presence of an endangered species can allow for the prevention of further development and human encroachment (Quigley and Swoboda 2007). Boulders is therefore a unique situation, where human settlement preceded the arrival of the endangered penguins. It has been acknowledged that there are inevitable issues surrounding the management of public beach areas due to the conflicting needs and preferences of local residents and visiting tourists (Oh et al. 2010). In 1995 there were two schools of thought amongst the Boulders residents regarding the visiting tourists. Firstly, some residents thought that management should limit the visiting tourists to avoid the risk of future conflicts and negative impacts that would result from a high influx of tourists into the area. Similar studies have shown a concern from residents towards the detrimental impact that visiting tourists may have on the natural habitats (Wang et al. 2010). However this was not a concern that was raised by the Boulders residents.

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The alternative attitude of the residents towards the visiting tourists was the need for an investment in adequate infrastructure to be able to cope with high visiting numbers (for example, the development of the boardwalk). In support of this, it has been found that residents at tourist destinations can have positive attitudes towards tourism from the understanding that it can generate local income along with other benefits (Lepp 2007). Since 1995, SANParks have indeed invested in improved infrastructure, and although the aspect of 'visiting tourists' scored reasonably poorly in this study (Figure 7), not a single respondent mentioned it as an irritating factor when given the opportunity. This suggests that SANParks have prevented the rising number of tourists from being a major annoyance or inconvenience to the local residents. Similarly, the presence of penguins nesting in private gardens was a prominent issue in 1995, and all residents looked forward to the erection of a penguin proof fence. Since the erection of the fence, only one resident, who lived further along the coastline, beyond the penguin proof fence, complained of penguins in their garden.

The respondents of the previous study realised that the management of Boulders was a complex issue that needed to combine the wishes of the residents along with the conservation needs of the African Penguins. They also considered it a step in the right direction to have SANParks, a conservation-oriented body, to manage the area (Morgan 1996). This consideration of penguin conservation has remained amongst the local residents, as the majority of today's respondents showed high levels of concern over the endangered status of the African Penguin. However, one complaint about the management of Boulders has remained; both the Simons Town Municipality and SANParks are said to be poor in considering the wishes of the local residents. In 1995, a committee was formed within which issues were discussed, but there was little resulting action. Comments made by residents in this

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study suggest that another committee should be established, and SANParks must improve their responsiveness to issues raised by residents.

The residents listed 15 areas of improvement for the SANParks management of Boulders (Table 6), and two of those were mentioned by several people independently of each other. Four people expressed a wish for improved prevention of the penguins accessing residential areas, and more importantly roads where penguins have been known to be hit by passing traffic. While the fencing that was erected has largely prevented penguins from nesting in gardens, it seems that they still leave the beach area and have access to the roads, suggesting that some areas of the fence need improvement, or perhaps just extending further along the coastline. Five of the residents also expressed a wish for free access to the beach area, as they feel that they have been cheated of an amenity to which they had previously had open access.

Visitors to the Park

The respondents' reasons for visiting, and the favourite aspects of the visits to Boulders, suggest that boardwalk users were at Boulders mostly for avitourism, whereas the beach users were there for recreational purposes with the added interest of penguin presence. Boulders is a unique site in the Cape Town area due to its sheltered beach and calm waters. These features, as in some other coastal landscapes around the world, are attractive to both bird and human life (Knight and Gutzwiller 1995). Temporal patterns of both penguin and human beach use vary daily and seasonally, and in some circumstances, such as the one at Boulders, both users can co-exist without undue disruption (Knight and Gutzwiller 1995). Boulders therefore not only offers speciality avitourism to those that are interested, but it also continues to offer purely recreational aspects to those that desire them.

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The Wildcard is a prepaid membership facility that enables entrance into national parks and provincial nature reserves in South Africa at a discounted rate. It is apparent that the advertising and promotion of the Wildcard is relatively ineffective. The majority of boardwalk users had never even heard of the Wildcard, and despite the ability to purchase one at Boulders, and the advertising of the card upon entry to the park, only a small proportion learnt of its existence after arrival into Boulders. Domestic tourists were least aware of the Wildcard within both the beach and the boardwalk users. It is in SANPark's interest to increase Wildcard sales as there would be a likely increase in local visitation, and a possible improvement in resident relations. New media techniques (such as weblogs and social network sites) have been found to be a powerful tool for advertising campaigns (Kerr et al. 2009), and could thus be utilised by SANParks to promote the Wildcard.

User awareness of the endangered status of the African Penguin was poor across both the boardwalk and the beach users (Chapter 2). The contingent valuation study (Chapter 2) revealed that willingness to pay to visit the penguins increased substantially after the users had learnt that African Penguins are endangered. There are information boards about several species of penguin at the entrance to the boardwalk section of the park, and the visitors are given a leaflet providing a lot of information about the African Penguin when they pass through the entrance gate. However, few visitors actually read the leaflet before leaving the park, as many of them had limited time constraints, and instead focussed their visit on viewing and photographing the penguins. It is thought that education is a cheap tool that can be used in the protection of natural environments (Buckley 2009). If information were conveyed to the visitors while viewing the penguins, it would enable them to learn more while still at Boulders. Information boards or SANParks staff acting as information points or guides on the boardwalk, or perhaps even a short information video on show at the entrance, would allow visitors to

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learn more about the penguin, thus improving visitor satisfaction, and perhaps increasing revenue into SANParks (Department of Trade and Industry 2010c). Such information is available to the public in the information centre, but this is generally only seen by the visitors upon their exit of the park, often shortly before a pre-determined meeting time on a bus tour for example.

It has been found that associating charity with a purchase (in this case, gate entry), is an effective way of encouraging payment (Strahilevitz and Myers 1998). Comments regarding WTP suggest that many visitors would be willing to pay additional entry fees if it was made clear upon arrival that their money would be going towards the conservation of the African Penguin. SANParks should perhaps then provide visitors with some information regarding where the revenue raised would be used in penguin conservation. Some respondents also said that they would be willing to pay additional money to Boulders if given the opportunity to make a voluntary donation; this could perhaps be a useful facility after information on the penguin's status had been provided. Several of the visitors stated that if entrance fees were increased, international tourists may still be able to afford their visit, but higher prices might exclude some local residents or those in lower income brackets. It has been suggested, therefore, that different entry fees could be charged between international and local visitors (a criterion only currently addressed with Wildcard sales). Other areas of suggested improvements by the visitors (Figure 9) further highlighted the requirements of improved information regarding the penguins. Some of the suggested improvements, however, are outside of the control of management. For example, many of the visitors wanted the penguins to be more active. The timing of the survey coincided with the penguin moult, and thus activity of the birds was unusually low, a factor outside human control (Underhill & Crawford 1999). The weather was a similarly unmanageable factor.

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Tourist Management

As the global popularity of ecotourism increases, the effective management of the visiting tourists is of paramount importance in order to minimise negative impacts on the natural resource (Orams 1994; Reynolds and Braithwaite 2001). It has been argued that a tourist carrying capacity must be established in ecotourism destinations to prevent high numbers of tourists from impacting on the environment (Muñoz and Pavón 2008). This solution, however, would limit incoming revenue; a factor that may ultimately impact on the resource through monetary limitations on conservation efforts. Alternatively, it has been argued that effective management should be able to mitigate the negative impacts to wildlife by regulating tourist behaviour (Orams 1994). The implementation of the boardwalk at Boulders effectively regulates visitor behaviour and movement, and successfully minimises the impact on the penguins. It has been found that the majority of tourists visiting wildlife resources support the implementation of strict management rules for the benefit of the resource, particularly if the conservation justification for the control is effectively communicated (Ballantyne et al. 2009, Semeniuk et al. 2009). Wildlife tourism can be prone to unmitigated development in an effort to maximise visitor satisfaction, often at the cost of the resource (Semeniuk et al. 2009). The facilities at Boulders, for example, the boardwalks, were designed sympathetically with the natural landscape; thus while access to Boulders is visitor-friendly, the development of infrastructure has no apparent negative impact on the penguins.

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CHAPTER 4

Study Review and Synthesis

Complications with the Study

There was sometimes difficulty in conducting the interviews due to a language barrier which could have lead to inaccurate answers given by the respondents through misunderstanding. There was also complication in the optimal timing of the questionnaire to fit into the respondents' visit to Boulders. It was important to present the questionnaire after the visitors had spent some time at Boulders so that the responses could most accurately reflect their visit. However, if the survey was conducted as the visitors were exiting Boulders, they were often in a hurry to leave. Within the residents' survey, the time of year that the questionnaire was conducted also proved to be out of sync with the timing of occupancy by many of the holiday home owners. Perhaps if the study had been conducted throughout the December holiday period, there would have been more opportunity to increase sample size, as many of the holiday home owners may have been present.

The visitation data that was provided by SANParks at Boulders did not detail the point of first entry or payment of visitors into Boulders. Accurate data regarding the proportion of visitation rates to the boardwalk and the beach is not available, and the relative impact of the answers to surveys conducted at either end could only be estimated. The questionnaire also did not effectively elicit if the users of the boardwalk were also going to visit the beach and vice versa. Movement of users between both facilities might have made the differences between the two sets of results less obvious.

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Future Research

The CVM receives criticism over its effectiveness as an economic valuation technique. Future research could conduct validity tests on the results, both internally (testing differences between individuals), and externally (testing differences between hypothetical and actual WTP) (Carlsson and Martinsson 2001). The CVM and the TCA were both conducted within limited time constraints. It was important to obtain a large sample size for both methods, and therefore, the questionnaires were necessarily short. Future research could include a more exhaustive questionnaire, which could attempt to elicit the income level of the respondents, although this would likely result in a relatively small sample size and could risk causing offence. This could be used to gain more valuation results, as it would indicate the relative differences in value between individuals from different income brackets. Income information could also be used to get an estimate of the value of time, and lost opportunity cost in visiting Boulders. This information could be incorporated into the TCA. The TCA could also be extended to incorporate international and domestic tourists outside of Cape Town. Further information would be required from the respondents regarding a more detailed place of origin (beyond country level), modes of transport from the country of origin, and the nature or length of their visit to South Africa. Future research could also focus on revealing the impact of the colony on the local economy in monetary terms.

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CONCLUSIONS

Chapter 2 of the study revealed that the value of the penguin colony at Boulders is substantial. The contingent valuation study revealed that visitors would currently be willing to pay additional entrance fees without any investment into improvements in the facilities, indicating that SANParks are not maximising the income into Boulders at present. The valuation results (Chapter 2) and the management recommendations (Chapter 3) both revealed that by improving the portrayal of information to visitors regarding the endangered status of the African Penguin, visitor satisfaction could be improved, and there could be a resultant increase in revenue. The WTP revealed that there is considerable unrealised potential through a simple lack of visitor awareness regarding the status of the African Penguin. Developments over the past two decades have allowed Boulders to be an effective ecotourism destination, and the value of this popular tourist destination has increased by over R10 million since 1995. The exact contribution of the colony to the local economy in monetary terms is unknown. However, it is apparent that the existence of the colony has a considerable impact on a wide variety of businesses across the entire southern peninsula of Cape Town.

Boulders beach has been transformed from what was once a small-scale recreational destination to a major ecotourism attraction. Through effective management by SANParks, this relatively small area now has over half a million visitors a year, with little or no negative impacts to the natural environment. Although complaints from the local residents remain, the previous strong feeling of animosity towards the penguins and their management has mostly faded over the past 15 years; a feat which is quite astonishing considering the numbers of tourists that visit the area each year. Boulders can be used as a model for the successful development of other ecotourism destinations, particularly those in an urban environment. If

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the appropriate infrastructure and managerial control was developed at other penguin colonies, it is apparent that the revenue raised could be considerable.

Studies on other African wildlife have revealed that the revenue raised by ecotourism alone is more than sufficient to offset the costs incurred in the protection of endangered species (Lindsey et al. 2005). The revenue already raised by Boulders is substantial, and this study revealed the extensive value of the colony through means other than the direct takings at the gate. The economic benefits from tourism can provide a rationale for costly efforts to conserve threatened species (Wilson and Tisdell 2001). This study demonstrates the economic worth of the penguin colony, and the potential for this value to be expanded with little investment. Despite the success of Boulders, the African Penguin species remains at risk of becoming extinct due to the surrounding pressures on the penguins' food source enforced by the commercial fishing industry, and continuing changes in the distribution of prey. The value revealed in this study can be used as justification for the improved spatial management of the fishing industry. The results suggested here could be evidence for governing bodies that the value of the colony can be contrasted against the opportunity costs to the fisheries incurred by relocating their efforts.

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Appendix A. User questionnaire for the beach and boardwalk at Boulders, Simons Town.

Penguin Valuation Questionnaire

Percy FitzPatrick Institute, University of Cape Town, Rondebosch, 7701, South Africa

1. Where do you live? Country_____ Town _____ Suburb_____
2. **If not from Cape Town:** where are you staying? (where did you travel from today?)_____
3. How did you get here? Car (number of people?) ____ Motorbike ____
   Tour bus ____ Push bike ____
   Public train/bus ____ Walk ____
   Other _____
4. Have you been here before? Y N
   If yes: how often do you visit? ___ Once/twice before
   ___ Number of times a week / month / year (circle)
5. Why did you chose to come here To see the penguins ____
   To visit the beach ____
   Both ____
6. **If beach only:** Does the presence of penguins influence your decision to visit this beach?
   ___ Positive influence ____ No influence ____ Negative influence
7. (**non-CT only**) Were you aware of the penguins before you came to Cape Town? Yes No Been before
8. (**non-CT only**) **If yes:** Were they part of your reason for visiting Cape Town? Yes No
9. How did you pay to come in? Wild Card ____ Included in tour ____
   Gate entry fee ____ Other _____
10. How much did you pay for that? R_____
    If not wild card: Are you aware of the 'Wild Card'? Yes No Just found out
11. The gate charge is R35 per adult (R10 per child). Do you think that this is good value for money? Yes No
12. *(Imagine that Wild Cards don't exist OR you were paying an entrance fee at the gate)*
    What is the maximum that you would have been willing to pay? Amount R_____
13. Are you aware that the African Penguin is in danger of going extinct? Yes No Just found out
    Penguin numbers have halved in over the past ten years largely due to the commercial fishing industry and are now just 10% of what they were 100 years ago. Urgent action is therefore needed for their conservation, and money raised by Boulders can contribute towards this conservation.
14. With this in mind, would it have changed the maximum that you would have been willing to pay to come here today or would you stick with your original amount? Change maximum ☐ Original amount ☐
    If change: How much? Amount R_____ Comment_____
15. What was your favourite thing about your visit? _____
16. How could your visit have been improved? (if at all) _____
17. Roughly how long are you visiting Boulders for?_____
18. Considering your trip out today, what proportion of your reason to come would you attribute to visiting the penguin colony at Boulders? _____ (as a percentage?)

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Appendix B. Country of residence data entry sheet for SANParks gate staff, Boulders, Simons Town.

Country	People Count
South Africa	
UK	
USA	
Germany	
Holland	
Italy	
Spain	
Japan	
Canada	
Belgium	
Austria	
France	
China	
Korea	
Australia	
New Zealand	
Brazil	
India	
Zimbabwe	
Tanzania	
Other	

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Appendix C. Tour operator survey for visiting companies to Boulders, Simons Town.

Tour Operators

I'm doing a study to try and discover the value of the penguin colony; not only in the direct takings of SANParks at Boulders, but the impacts on the South African economy and local businesses such as yours. I won't report specifically on any single business, I just want to find out the overall impact that the penguin colony has.

Name and description of the company

How often do your tours visit the penguin colony at Boulders Beach? (how many / how regularly)

High Season:

Low Season:

Approximately how many visitors do you take per tour?

High Season:

Low Season:

Do you consider the penguin colony to be a major selling point of your tours?

What percentage of your clients specifically ask to visit the penguin colony?

How much are your day tours to visit the penguins?

How many people are employed in the company?

How long has the business been running for?

Are you an independent business or do you work as part of a larger company?

Can you suggest any other tour operators that I should contact?

Extra comments

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Appendix D. Local business survey for the businesses surrounding Boulders, Simons Town.

Local Businesses

I'm doing a study to try and discover the value of the penguin colony; not only in the direct takings of SANParks at Boulders, but the impacts on the local economy and businesses such as this one. I won't report specifically on any single business, I just want to find out the overall impact of the penguin colony.

Name and description of the company

What are the advantages of being based so close to the penguin colony?

What are the disadvantages (if any) of being based so close to the penguin colony?

Can you estimate what proportion of your business results from visitors of the penguin colony?

How many people are employed in this establishment?

How long has the business been running for?

Are you an independent business or do you work as part of a larger company?

Would you mind telling me your approximate annual turnover?

Can you suggest any other local businesses that I should visit?

Extra comments

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Appendix E. Comparing responses for questions in the user survey on the beach at Boulders, Simons Town before (*n = 100*) and during (*n = 100*) the mid-summer school holidays.

Survey Question	**Pearson's Chi-Square**	**df**	***P***	***n***
Had the respondent visited Boulders before?	10.602	1	0.001	200
What was the respondents' reason for the visit?	0.767	2	0.681	200
Did the respondent consider the entrance fee to be good value for money?	0.258	1	0.611	200
Was the respondent aware that the African Penguin was in danger of going extinct?	3.905	2	0.142	200
Did the provision of information change the respondents maximum willingness to pay?	0.5	1	0.479	200

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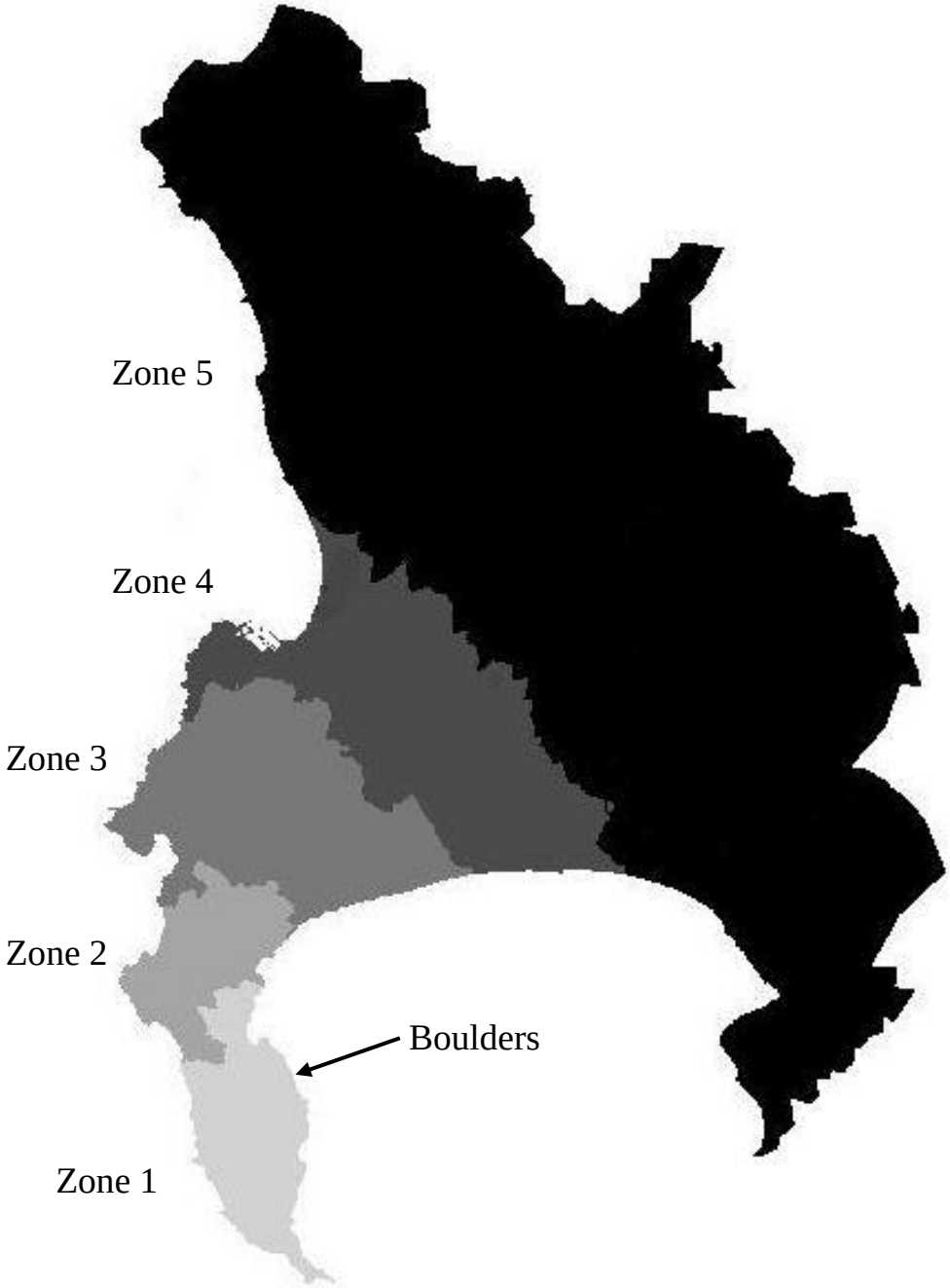
Appendix F. A map of Cape Town and the Southern Peninsula, detailing the travel distance zones used in the travel cost analysis. Zone 1 = 0-10 km, Zone 2 = 10-20 km, Zone 3 = 20-30 km, Zone 4 = 30-50 km, Zone 5 > 50 km.



Appendix G. The country of residence of the respondents who were surveyed.

Respondent country of residence	Number Surveyed	Percentage Surveyed
United Kingdom	106	21.2
United States	46	9.2
Germany	48	9.6
South Africa	158	31.6
Holland	30	6
Canada	15	3
France	11	2.2
Austria	9	1.8
Switzerland	9	1.8
Belgium	8	1.6
Sweden	8	1.6
Japan	5	1
Denmark	4	0.8
Singapore	4	0.8
Australia	4	0.8
Egypt	4	0.8
Italy	3	0.6
Brazil	3	0.6
India	2	0.4
Norway	2	0.4
Thailand	2	0.4
Poland	2	0.4
Angola	1	0.2
Argentina	1	0.2
Botswana	1	0.2
China	1	0.2
Dubai	1	0.2
Estonia	1	0.2
Indonesia	1	0.2
Malaysia	1	0.2
New Zealand	1	0.2
Portugal	1	0.2
Russia	1	0.2
Trinidad	1	0.2
Venezuela	1	0.2
Spain	1	0.2
Niger	1	0.2
Mozambique	1	0.2
Greece	1	0.2
Total	500	

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Appendix H. Questionnaire to the local residents surrounding Boulders Beach, Simons Town

Local Residents Questionnaire

1. Are you a i) permanent resident? ☐ ii) holiday home owner ☐ iii) here on holiday ☐
2. For how long will you/do you stay here for? _____
3. For how long have you lived in/been visiting this residence? _____
4. How often do you visit the a) beach? _____ Number of times a week / month / year (circle)

   ☐ Never

   b) boardwalk? _____Number of times a week / month / year (circle)

   ☐ Never
5. Does the presence of penguins influence your decision to live or holiday here?

☐ Positively ☐ Negatively ☐ Not at all

6. How do you feel about the following factors associated with living in such close proximity to a penguin colony?

	I really like it	**I like it**	**It doesn't concern me**	**It's a bit annoying**	**I hate it**
Access to a rare species	☐	☐	☐	☐	☐
Visiting tourists	☐	☐	☐	☐	☐
Smell of the penguins	☐	☐	☐	☐	☐
Noise of the penguins	☐	☐	☐	☐	☐
Character of the penguins	☐	☐	☐	☐	☐
Loss of amenity of beach	☐	☐	☐	☐	☐
Other_____	☐	☐	☐	☐	☐

7. Are you aware that Table Mountain National Park (SANParks) took over management of the area from Simons Town Municipality in 1998? Y N
8. **If yes:** Has this change improved or worsened conditions for local residents/visitors such as yourself?

☐ Improved ☐ Worsened ☐ Both

9. How?_____
10. In your opinion, how could the management of the park be improved?

_____

_____

_____

11. The African Penguin is at risk of going extinct, does this concern you at all?

☐ Not at all ☐ A little bit ☐ A lot

Comment_____

_____

12. Have you got any additional comments to make about the penguins?

_____

_____

_____

_____

Thank you very much for your time!

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Appendix I. Mann-Whitney U test statistics showing the difference between the surveys conducted above (n = 10) and below (n = 16) the main road regarding the attitudes of the local residents towards the penguin colony and associated factors in Boulders, Simons Town.

	Mann-Whitney U test statistics			
Factor	U	Z	*n*	*P*
Having access to a rare species	66	-0.78	26	0.437
The visiting tourists	79	-0.06	26	0.955
The smell from the penguins	65	-0.97	26	0.331
The noise from the penguins	54	-2.00	26	0.046
The appealing character of the penguins	69.5	-0.61	26	0.544
The loss of amenity of the beach	74	-0.36	26	0.720

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