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Economic Value of the Kogelberg Coast, Western Cape, South Africa

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Economic Value of the Kogelberg Coast, Western Cape, South Africa

Jane K. Turpie and John de Wet

Abstract

The amenity value of the Kogelberg Coast of South Africa was estimated on the basis of a survey of users, property data and park visitor statistics, as well as spatial data on coastal features, development and recreational activities. In addition to the permanent population of about 13 000, visitors spend an estimated 4.3 to 5.3 million visitor days per year, of which holiday home owners, other overnight visitors and day visitors account for about 22 percent, 56 percent and 21 percent, respectively. Coastal activities contributed 71 percent to all users' enjoyment of the area. Two-thirds of visitors in summer were beach-oriented visitors and the remainder were fishing and water sport-oriented. While most South Africans were on single destination trips, going to the Kogelberg area was only 59 percecnt of the reason for their trip for foreign visitors, who tended to be visiting multiple destinations. Coastal cleanliness and bathing safety were the most essential coastal attributes for visitors, followed by the adjacent mountainous terrestrial environment and marine wildlife. Visitor expenditure attributable to the Kogelberg coast, in Rands, was estimated to be in the range of R191 to 235 million per annum. Boat-based whale-watching in the area brought an additional R1.39 million accruing to towns outside the area. Coastal property in the area was worth approximately R7.3 billion, generating an estimated annual economic output of R59 million. Thus, the recreational value of the coast was estimated to be on the order of R272 million per annum. Simple scenario evaluation suggested that the value of the coast could be increased most by eradicating crime. Other scenarios that result in a significant increase in value include expanding the marine protected area system, as long as fishing catches in surrounding areas increase, and better enforcement of environmental laws. Litter would have the greatest negative impact on value, followed by a substantial increase in the number of houses or a substantial decrease in the number of cetaceans.

Key Words: ecosystem services, recreational value, coastal management

JEL Codes: Q26, Q51, Q57

Discussion papers are research materials circulated by their authors for purposes of information and discussion. They have not necessarily undergone formal peer review.

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Economic Value of the Kogelberg Coast, Western Cape, South Africa

Jane K. Turpie and John de Wet*

Introduction

The Kogelberg Biosphere Reserve (KBR) is an important conservation area located near Cape Town in the Western Cape, South Africa. Centered around a mountainous core terrestrial conservation area, it also includes a dramatic section of coastline and the immediate inshore marine area, part of which is protected in the Betty's Bay Marine Protected Area (Figure 1). This scenic coastal area, which includes the villages of Rooi Els, Pringle Bay, Betty's Bay and Kleinmond, is an important area for recreation as well as for biodiversity conservation. Thus, future management of the area will have to take cognizance of the way in which the coast contributes to its recreational value. A spatial assessment of this contribution will be useful in informing the management and zoning of activities along the coast.

The amenity value of any stretch of coast manifests to some degree as economic value through tourism and property markets (Figure 2). Visitors generate expenditure through travel to the area, accommodations, restaurants and the retail sector. Not all tourism expenditure will necessarily be attributable to the coast, as there are multiple attractions in the area and visitors will incur expenditures on the combined attractions. Although visitors themselves probably do not consciously make the distinction, it is necessary to isolate the expenditure attributable to the coast. This can be done by asking visitors the motivation for coming to the area as well as the use of the different attractions in the area. The value that residents hold for the coast is reflected in the premium paid for properties with access to, or views of, the coast. Holiday home owners spend money both on property and travelling to the area.

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Figure 1. Location of the Kogelberg Biosphere Reserve Showing the Core Conservation Areas

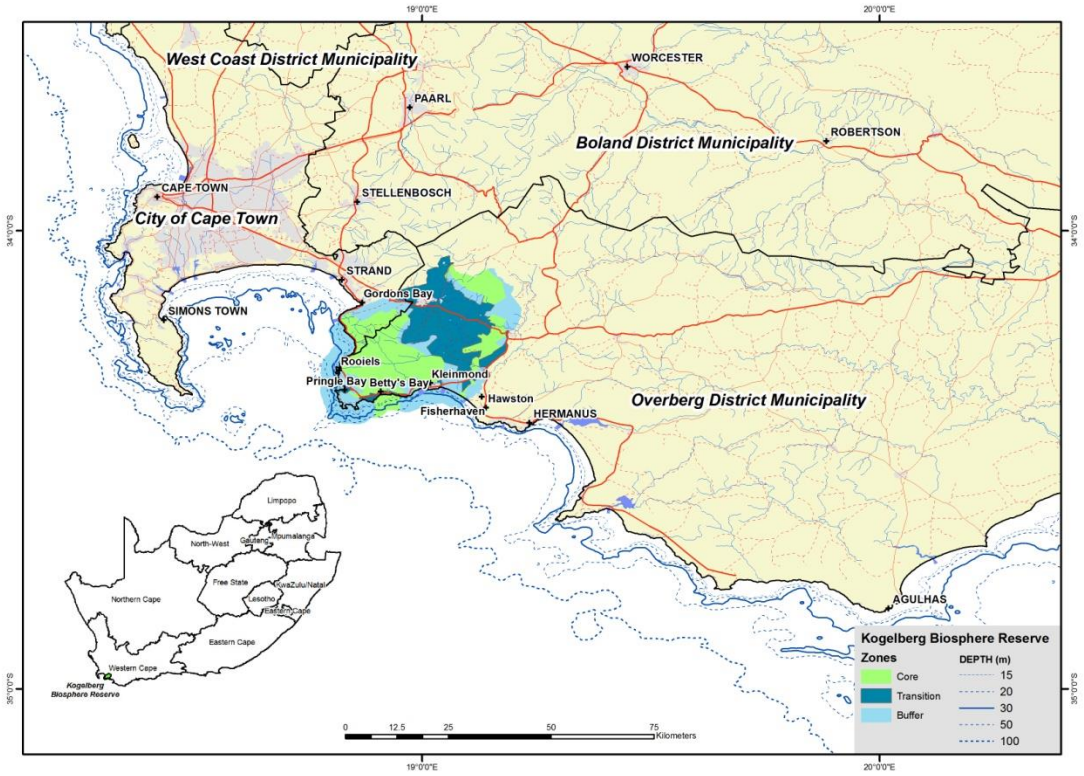
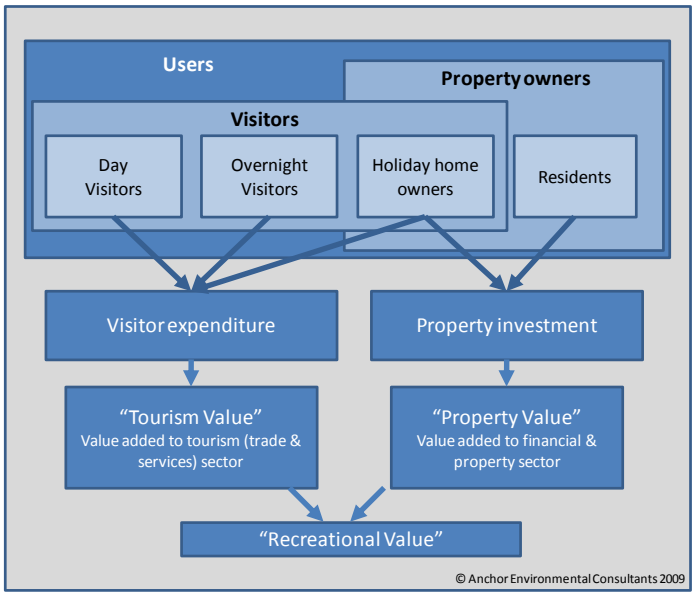


Figure 2. Schematic Diagramme to Explain the Terminology Used in the Report



The aim of the study is to estimate the tourism and property value attributed to the Kogelberg coast, and to estimate how this value might be affected by alternative future management scenarios. The paper proceeds as follows. The next section discusses methods, followed by results, and finally by a discussion.

Methods

Overall Approach

This study was based on an interview survey of coastal users and property owners, spatial data on visitor numbers collected in aerial surveys, and available data on coastal property, population, recreational activities and visitor numbers. A questionnaire survey was conducted in mid-December 2008, during tourism high season, in which 715 respondents were interviewed by a team of seven trained enumerators. The study aimed to estimate the contribution of the coastal area to recreational values revealed in the form of income generated through tourism and property sales.

Total User Numbers and Distribution

In order to estimate the recreational value of the Kogelberg coast, it was necessary to determine the total number of annual visitors and number of days they spent in the area, in addition to the resident population. An estimate of the total number of people residing in the study area permanently and during the peak holiday season was obtained from the Overberg Municipality. Further estimates were made, including day visitor numbers, based on the ratios of permanent residents, overnight visitors and day visitors encountered during the survey, taking into account the stated proportion of time the three groups spent at the coast (i.e., the relative probability of encounter by enumerators). These estimates of visitor numbers at points in time during the peak season (December/January) were converted to total visitor numbers during December on the basis of information collected on length of stay. The number of visitor days for December were then estimated. The estimated visitor days for December were extrapolated to the rest of the year on the basis of seasonal (monthly) variation in the visitor numbers to the Harold Porter Botanical Gardens, located within the study area.

In order to describe the spatial pattern of use of the coast, three flights were carried out over the coast to observe and record the activities being undertaken, on 18 and 30 December 2008 and 2 January 2009. The dates were chosen to coincide with the peak holiday season and good weather days, in order to obtain maximum numbers. During each flight, the number of

people participating in various activities was counted in each of 71 segments of the coast. These activities were

- Fishing from the shore, which included angling, collecting bait from the rocks or inter-tidal pools and collecting inverts such as rock lobsters, mussels or oysters;
- Water sports such as snorkeling, scuba diving, surfing, paddle skiing, boogie boarding, surf skiing, kayaking, kite surfing and swimming,
- Boating, which included ski boating, deck boating, jet skiing, dinghies and rubber ducks, with a distinction between using the crafts for fishing or leisure, and
- Shore-based activities such as relaxing, picnicking or exercising.

Recreational Activities and Visitor Typology

Respondents to the questionnaire survey were asked to indicate whether they participated in various activities ("never," "some" or "lots") as well as to indicate the extent that five groupings of these activities (fishing, water sports, coastal nature appreciation, beach and non-coastal activities) contributed to their enjoyment of the area. Some respondents also indicated other activities in which they participated while in the area, but these other activities were excluded from this analysis because the low level of response for any activity did not make inclusion meaningful.

Using the above information as well as other relevant data, visitors (including holiday home owners) were divided into relatively homogenous groups in terms of their activity profiles. This was done by performing a cluster analysis using the Primer software package on two sets of data: scores for participation in the activities and the relative contribution of the grouping of activities to the enjoyment of the area. Based on these data, the cluster analysis organised respondents with similar interests into groups that could be further analysed and used for the spatial distribution of the value of the coast.

Attraction of the Coast and Its Attributes

Respondents were asked to indicate what proportion of their time in the KBR area was spent at or within sight of the coast. They were then asked to indicate the extent to which several characteristics contributed to their enjoyment of the area. Possible responses were "Detract," "Little/no influence," "Enhance," and "Essential attraction."

Contribution of the Coast to Tourism Value

One of the more controversial aspects of environmental economics is the estimation of net economic values of untraded environmental services; these values typically include consumer surplus and sometimes also producer surplus. In this case, the net economic value generated by coastal tourism includes the producers' surplus generated by visitors' expenditure and the consumer's surplus of the users. Visitors' expenditure can be broken down into what they spend within the area (on-site costs) and what they spend travelling there (off-site costs). Their consumers' surplus is the amount they would have been willing to pay over and above their actual expenditure. Where tourists provide the bulk of resource users, consumers' surplus can be measured by constructing a demand curve using the Travel Cost Method (Bockstael et al. 2001), but this is fraught with difficulties due to the complexity of visitor trips, and further complicated by the high number of holiday home owners. Tourism value was thus assessed in terms of the total expenditure that could be attributed to the coast, which was assumed to be similar in order of magnitude to the total value added to national income, assuming relatively little leakage.

Contribution by Land-Based Visitors to the KBR Area

The total expenditure by visitors to the Kogelberg coast was estimated based on average expenditure reported in the surveys and estimated visitor numbers. Survey responses were then used to isolate the proportion of this value that could be attributed to the coast. The total expenditure attributable to the coast as a whole was then split across different sections of the coast on the basis of spatial user numbers. Respondents were asked to indicate the total amount their group budgeted to spend during the entire trip, and were reminded to think about their expenditure on travel, accommodation, tours, restaurants and shops. They were also asked to indicate how much of their total trip budget would be spent in the Kogelberg area, as well as the degree to which visiting the Kogelberg area was the reason for the trip, expressed as a percentage. Questions relating to the percentage enjoyment gained from coastal activities (see above) and the percentage of leisure time spent on the coast were used to estimate the value attributable to the coast. The analysis was performed separately for each type of user group. Total tourism value of the coast was allocated spatially to the different coastal segments based on the observed distribution of people participating in different types of activities along the coast from the aerial survey data. These activities were grouped into the main user groups identified for visitors, and values were distributed according to the expenditure patterns of these groups.

Contribution by Boat-Based Ecotourism

In addition to the activities described above, which pertain to visitors who arrive by road, the use of the area by boat-based ecotourism operators was also investigated. The study concentrated on whale-watching, since shark-watching and pelagic seabird boats do not utilize the study area. Information on the value of whale watching was obtained from the literature (Turpie et al. 2005). Data on the position of whale-watching stops by operators from the nearby town of Hermanus was obtained from the Department of Environmental Affairs and plotted to ascertain the amount of this value that could be attributed to the study area, as well as its geographic spread.

Contribution of the Coast to Property Values

Property values associated with the natural environment are typically investigated using the hedonic pricing method, which is a multivariate statistical technique that identifies non-market valuation of the characteristics of the commodity rather than of the entire commodity itself (Pearce & Turner 1990; UNEP 1995; Mahan et al. 2000; Bolitzer & Netusil 2000; Price 2003; Hobden et al. 2004). The method is based on the premise that a commodity such as a house can be defined as a bunch of measurable characteristics or variables, such as size, location and views, which together determine the total price of the commodity (Russell 2001). The approach assumes that it is possible to isolate the contribution of a given variable and thus estimate the relative proportion of the full value of a commodity that can be attributed to the given characteristic or variable.

The hedonic pricing method assumes that consumers have access to the entire housing market, that they can differentiate among variables of a property, and that there is a sufficiently wide variety of characteristics that no one is stuck in an indecisive situation (Kulshreshtha & Gillies 1993; UNEP 1995; Russell 2001). It further assumes that the market is in or near equilibrium (Russell 2001). While these assumptions may not always hold true, it is accepted that this method provides a reasonable approximation of the actual values. Numerous studies have used this approach to investigate the value of aquatic environments to nearby property owners in urban areas (Mahan et al. 2000; Bin & Polasky 2002).

The general public survey conducted along the Kogelberg coast from 11 to 16 December 2008 included visitors to the area as well as property owners, who were either permanent residents or holiday home owners. Of the 715 respondents, 268 (37.5% of respondents) were permanent residents and 105 (14.7%) were holiday home owners. These property owners were asked for information about the property, including its location; distance from the coast or

estuary (with options being sea/estuary frontage; sea/estuary view; and distance of less than 1 km, 1-5 km or more than 5 km from sea/estuary); number of bedrooms and bathrooms; and an approximate value of the property. Properties for which data were incomplete were also excluded, as were three outliers in the sample. In addition, properties associated with formal and informal low-income townships were excluded, as these properties were unlikely to command a coastal premium. The remaining data were analysed to establish the various attributes that contributed to property value in order to isolate the premium associated with the coast. In categorising the size of the properties, one- and two-bedroom properties were lumped together, as were six- to eight-bedroom properties, because of the small sample sizes in these categories.

Information was obtained from the district municipality on the number of houses in each of the main towns along the Kogelberg coast (Kleinmond, Betty's Bay, Pringle Bay, Rooiels and Hangklip). The formula derived from the analysis of the data collected during the survey was applied to these properties to derive a premium for the entire coast, with the results extrapolated to determine a premium attributable to the coast based on the number of properties along the coast and the proportion of those with a sea view. The analysis was done for the coast collectively rather than for each town along the coast, as the sample size for each of the towns was not sufficiently large to apply to that specific town.

The hedonic model was used to estimate the total value of properties based on the total number of properties, the average size of properties and the proportion of houses at different distances from the coast in each village area. A base price without any coastal premium was estimated by applying the same model, but assuming that all properties were at the maximum distance from the coast. This was subtracted from current value to obtain the aggregate coastal premium. This capital value was converted to an annual value by estimating the cost of capital (i.e., income to the financial sector) and the income to the property sector, based on estimated turnover rates and payments relating to the purchase of property. The aggregate premium in each area was attributed to the corresponding section of coastline.

Potential Impacts of Changes in Management

Stated-preference methods, including elements of Conjoint Valuation and Contingent Valuation, were used to estimate the potential impacts of alternative management scenarios (and hence environmental quality) on recreational value. Conjoint analysis is a market research technique which is used to quantify preferences for multiple attributes at multiple levels (Boxall et al. 1996; Stevens et al. 2000). The contingent valuation method (Mitchell & Carson 1989) is widely used to value environmental amenities or evaluate preferences (Mackenzie 1993; Stevens

et al. 2000; Shultz et al. 1998). It involves eliciting respondents' willingness to pay to achieve or prevent a change, or their willingness to accept compensation for a change. However, its accuracy continues to be a subject of debate (Bishop et al. 1995; Boxall et al. 1996; Stevens et al. 2000).

In this study, respondents were presented with ten possible future scenarios and requested to rate the recreational value of the Kogelberg coast on a scale of 0-10 under each of these scenarios, as a form of contingent ranking. The most preferred and least preferred scenarios were selected. For each of these scenarios, property owners indicated the effect on their property value while visitors indicated the effect on the amount of time spent in the Kogelberg area. For the preferred scenario, respondents were requested to indicate whether they would be willing to pay to implement or maintain the scenario on the assumption that it would require additional public funding, with property owners supplying a monthly willingness to pay (WTP) and visitors a daily WTP. Similarly, for the least preferred scenario, respondents indicated a WTP assuming that this scenario would come about without additional funding, or were requested to give a reason why they were not willing to pay. The WTP responses for increases in utility and to prevent decreases in utility were used to rescale the utility scores, the upper limits of which had been constrained by the respondents' starting score of the status quo out of 10. This was done by multiplying the increase in utility score by the ratio of average WTP per 1-point increase versus a 1-point decrease in utility and adjusting the overall score accordingly, for visitors and home owners, respectively. Potential changes in value were estimated using two methods: the stated change in behaviour, and the proportional change in utility relative to the status quo multiplied by current value.

Results

Respondent Characteristics

Respondents were predominantly white (62%) or coloured (32%), and permanent residents (37%) comprised the largest proportion of respondents, followed by overnight visitors (35%) and holiday home owners (15%). Whites were the highest number of respondents for all four categories interviewed, but comprised a relatively higher proportion of holiday home owners and day visitors, while coloureds made up a relatively higher proportion of overnight visitors. Most of the overnight visitors (91%) and day visitors (86%) interviewed were from South Africa, with the foreign visitors split between the United Kingdom (8% for both overnight and day visitors) and 11 other countries (4% and 7% for overnight and day). South Africans also

owned most of the holiday homes (91%), with overseas residents from six countries owning the remaining 9% of holiday homes. Most South African overnight visitors (87%) and day visitors (95%) were from the Western Cape, while 9% and 5% respectively were from Gauteng. Most South African holiday home owners (72%) were from the Western Cape, with the rest from Gauteng (18%) and the other provinces (10%). Some 40% of South African respondents earned more than R16 000 per month, equivalent to about US $20 000 per annum at the time of the survey. In comparison, 70% of overseas respondents earned more than R16 000 per month. Most of the respondents were in their 30s (26%) or 40s (27%), with a relatively higher proportion of permanent residents and holiday home owners aged above 50.

Estimated Total Resident and Visitor Numbers

Information supplied by the Hangklip/Kleinmond Tourism Bureau (HKTB) indicates that the number of residents in the coastal towns (Kleinmond, Betty's Bay, Pringle Bay, Rooiels and Hangklip) increases from 13 000 permanent residents to 40 000 during the December peak holiday season. This implies that there are 27 000 holiday makers during the peak season, which includes both holiday home owners and other overnight visitors.

Permanent residents made up 37% of the respondents (n = 715). Holiday home owners, overnight visitors and day visitors were respectively 15%, 35% and 13% of the sample. The survey found that day visitors and overnight visitors spent most of their leisure time on the coast (both 72%), with holiday home owners (62%), and permanent residents (54%) spending less of their leisure time on the coast. The relative probability of encountering a day visitor or an overnight visitor during the survey was thus higher than that of encountering a permanent resident. Based the 13 000 permanent residents and on the ratio of respondents encountered during the survey, adjusted for the relative probability of encountering each type of respondent, the range of the number of visitors for a day in December was estimated, as well as the total number of visitors during December and the visitor days for that month (Table 1).

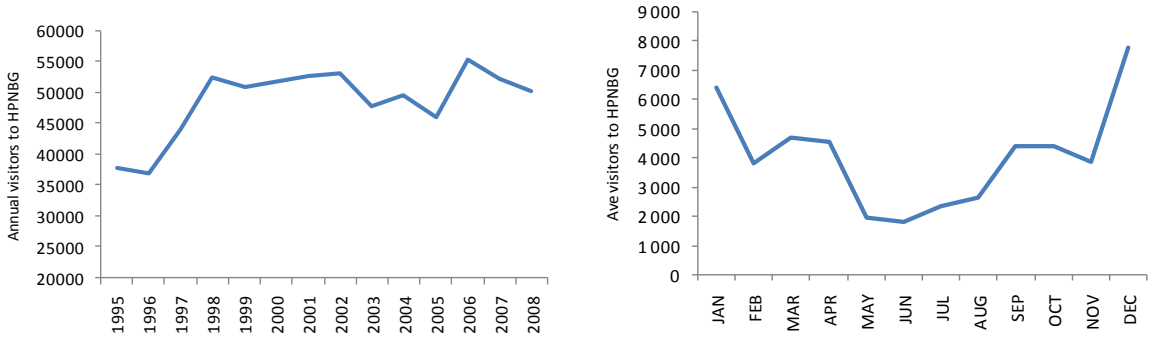
Monthly visitor numbers have been provided from 1995 to January 2009 for Howard Porter National Botanical Gardens (HPNBG, Figure 3). The annual visitor numbers increased steadily between 1995 and 1998; since then, the number of visitors annually has fluctuated between 46 024 in 2005 and 55 449 in 2006, with 51 141 annual average visitors for the period 1998 to 2008. The average number of monthly visitors peaks during the December and January holiday months and is lower during the winter, from May to August. In December 2008, the number of visitors to the HPNBG was 9 830, the highest monthly attendance recorded over the period under review.

Assuming that the same proportion of visitors to the Kogelberg area visit the HPNBG throughout the year, the estimated number of visitor days for December were extrapolated to provide an estimate of total annual visitor days to the Kogelberg area of between 4.2 million and 5.3 million (**Error! Not a valid bookmark self-reference.**).

Table 1. Upper and Lower Bound Estimates of Visitors Per Day, Total Visitors and Visitor Days for December and Estimated Annual Visitor Days for the Kogelberg Area

Visitor type	Instantaneous visitors in December	Total visitors in December	Average length of stay	Visitor days in December	Annual visitor days
Upper bound					
Holiday home owners	7 703	21 911	10.9	238 798	1 184 713
Overnight visitors	19 297	236 686	2.5	598 202	2 967 765
Day visitors	7 259	225 023	1.0	225 023	1 116 371
Total (upper)	34 259	483 620		1 062 023	5 268 848
Lower bound					
Holiday home owners	5 789	16 468	10.9	179 470	890 374
Overnight visitors	16 077	197 190	2.5	498 379	2 472 530
Day visitors	5 888	182 520	1.0	182 520	905 508
Total (lower)	27 754	396 177		860 369	4 268 412

Figure 3. a) Annual and b) Average Monthly Visitors to the HPNBG from 1995 to 2008 (HKTB 2009)

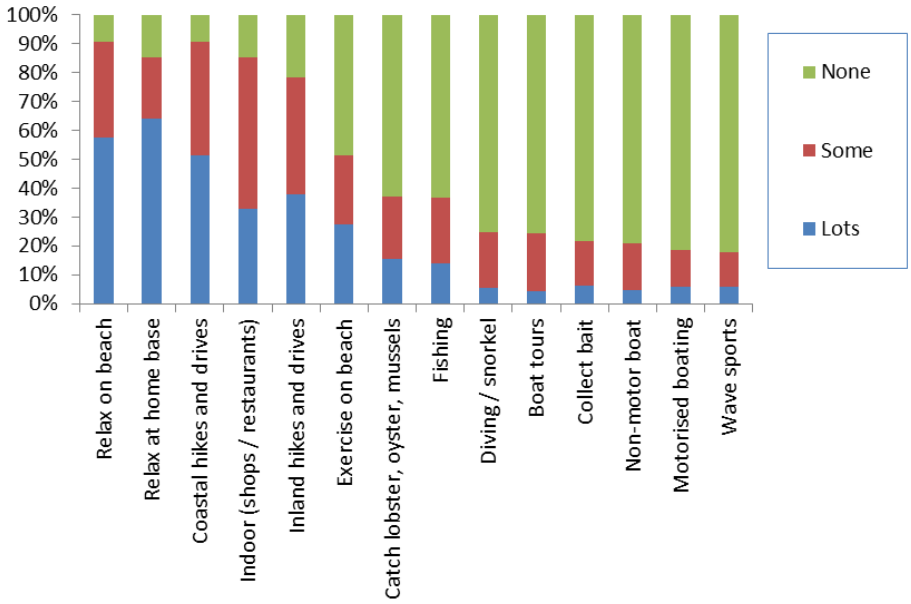


Activities and User Groups

Activities

Relaxing on the beach and relaxing at home were the most common activities, followed by coastal nature-based hikes, walks and drives. Relatively little time was devoted to collecting bait, non-motorised and motorised boating, wave sports, diving, snorkeling and boat tours (Figure 4). "Other" activities received 48 responses, with cycling the most popular (n = 11). None of the other activities suggested by the survey, which ranged from bird-watching to the fynbos festival,[1] horse riding or working, received more than five responses.

Figure 4. Percentage of Respondents Who Participated "Lots", "Some" or "Not at All" in Different Activities, and Weighted Score for Activities (n = 713)



Coastal activities contributed 71% to users' total enjoyment of the Kogelberg coast, with beach activities (26%) and coastal nature (27%) contributing the bulk of this, and fishing (13%) and water sports (5%) making a relatively smaller contribution. Non-coastal activities such as relaxing at the home base, and indoor activities such as shopping and restaurants, accounted for the balance (29%). Fishing and coastal nature contributed relatively more and non-coastal

[1] A festival celebrating the indigenous vegetation of the area.

activities relatively less to the enjoyment of the area by day visitors in relation to the other respondent groups.

Visitors spent an average of 69.7% ± 27.8% S.D. of their leisure time at the coast (on the shore, in the water or in sight of the coast), with day visitors spending slightly more time relative to overnight visitors (71.7% ± 29.8% S.D vs 69.1% ± 27.2% S.D) and considerably more time than permanent residents (54.4% ± 27.3% S.D.).

Categories of Users

Cluster analysis revealed two distinct groups of users in terms of the contribution of different groups of activities to their enjoyment of the area. The first group comprised those respondents who had indicated higher relative enjoyment from fishing and water sports, while the second group comprised the respondents for whom coastal nature, the beach (including swimming) and non-coastal activities were more important. Cluster analysis based on time spent in different activities grouped motorised boating with other fishing activities such as collecting bait and angling. Motorised boating seems to be related to fishing rather than to leisure water sports (where it had been grouped in the questionnaire). This was confirmed by the aerial survey, which found that most motorised boats in the sea were being used for fishing. Other water sports formed a separate cluster. In addition, the latter analysis revealed that exercising on the beach was more closely linked to water sports activities than to beach activities.

It was decided to allocate respondents to two groups based on the cluster of the extent to which activities contributed to their enjoyment of the coast, as this provided a clearer grouping than the activity-based cluster groups. Respondents were thus allocated to groups according to the score generated for each respondent from the Primer principal components analysis results. A total of 67% of visitors were categorised in the beach-oriented group and 33% in the fishing and water sports-oriented group. This split of the groups corresponded closely with the observed participation in activities from the aerial count, which showed that 65% of coastal users were involved in beach or swimming activities, and the other 35% in fishing (15%) and water sports (20%). Overnight visitors (77%, n = 249) were relatively more likely than holiday home owners to be shore-based (50%, n = 104) and day visitors (58%, n = 91).

Attraction of the Coast and its Attributes

Respondents rated the recreational value of the Kogelberg coast compared with other South African coastal areas highly (average rating of 7.8 where 10 indicates total satisfaction). As expected, permanent residents (8.0) rated it higher than holiday home owners (7.8), overnight

visitors (7.7) and day visitors (7.3). Most South African visitors (87.4%) had visited the Kogelberg area previously, but only 28.3% of foreign visitors had been to the area before. Holiday home owners spent most of their trip (93%) in the Kogelberg area. Overnight visitors and day visitors spent an average of 68% and 49% of their trip in the Kogelberg area, respectively (Table 2). Holiday home owners on average spent considerably more time in Kogelberg than did overnight visitors – an average of 10.9 (± 2.9 S.D.) days and 2.5 (± 3.1 S.D.) days, respectively – and foreigners spent more time than South Africans in the area.

Table 2. Geometric Mean (and Confidence Limits) Length of Total Trip and to the Kogelberg Biosphere Reserve (KBR) Area, Expenditure pppd for the Total Trip and in the Kogelberg Area, Mean Percentage Reason for Whole Trip to Come to the Kogelberg Area and Mean Percentage of Leisure Time Spent on the Coast for User Groups (n = 444)

User group	Trip length (days)		KBR as % reason for trip	% leisure time spent on coast	Average spent (R pppd)			
	Total	In KBR			Total trip	Spent in KBR area	Spent on KBR area	Spent on KBR coast
Beach	4.24 (0.99-18.17)	2.71 (0.78-9.36)	86% (±27%)	69% (±29%)	97 (28-339)	77 (22-263)	83	58
Fish/sport	4.26 (1.03-17.65)	3.47 (0.92-13.18)	87% (±24%)	72% (±28%)	85 (31-235)	52 (17-156)	74	53
Combined groups	4.25 (1.00-17.96)	2.95 (0.82-10.57)	86% (±26%)	70% (±29%)	93 (29-0301)	67 (20-224)	80	56

The last two columns are derived values.

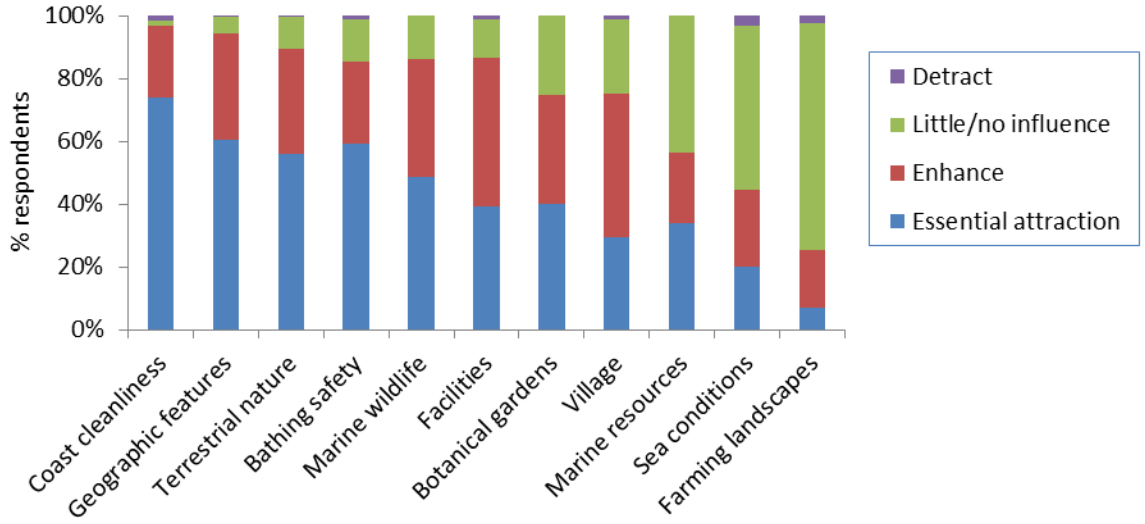
As expected, going to the Kogelberg area was a bigger reason for the trip for South Africans (average 89.9%), who tended to be on single destination trips, than for foreign visitors (59.4%), who tended to be visiting as part of a larger sight-seeing tour. There was no noticeable difference between holiday home owners and overnight visitors, although Kogelberg was less important for foreign day visitors.

Only 26% of holiday home owners were not already aware of the existence of the Betty's Bay Marine Protected Area (MPA). Among the remaining visitors, some 48% of South Africans and 29% of foreigners already knew about the Betty's Bay MPA before their visit. Of those who had visited the MPA, 88% did so to walk around and/or view the penguins and 11% did so for diving or snorkeling. Neither the presence of the penguin colony nor the Betty's Bay MPA was a major influence on property owners to invest in the area or for visitors to come to it.

Coastal cleanliness was the most important attribute contributing to respondents' enjoyment of the Kogelberg coast, followed by its geographical features, natural terrestrial backdrop and bathing safety. Sea conditions and farming landscapes were the least important

characteristics (Figure 5). Apart from the listed characteristics, 42 responses were received for the "other" category, of which two indicated that crime or litter detracted from the area, while the other responses were seen as either enhancing or being essential to the experience. A wide range of characteristics was recorded, with the tranquility of the area (n = 8) and the friendliness of the people (n = 5) being the most common responses.

Figure 5. Extent to Which Characteristics Contribute to Enjoyment of Area and Weighted Score for Characteristic (n = 711)



Tourism Value

The expenditure on land-based tourism (i.e., excluding those arriving by boat) includes the value of shore-based and boat-based activities. The stated average daily expenditure per person per day (pppd) for both the entire trip and the expenditure in the Kogelberg area was higher for overseas visitors than it was for South Africans, while overnight visitors spent more in the Kogelberg area (R77 pppd) than did holiday home owners (R59 pppd) and day visitors (R50 pppd). The higher expenditure by overnight visitors is to be expected, as these visitors have to pay for accommodation.

Table shows, for each group, the average length of the entire trip and the length of stay in the Kogelberg area, the average expenditure per person per day (pppd) for the trip and in the area, the percentage reason for the whole trip away that the respondents attributed to Kogelberg and the percentage of leisure time spent on the coast. From this, the average expenditure attributed to the KBR area and its coast are derived.

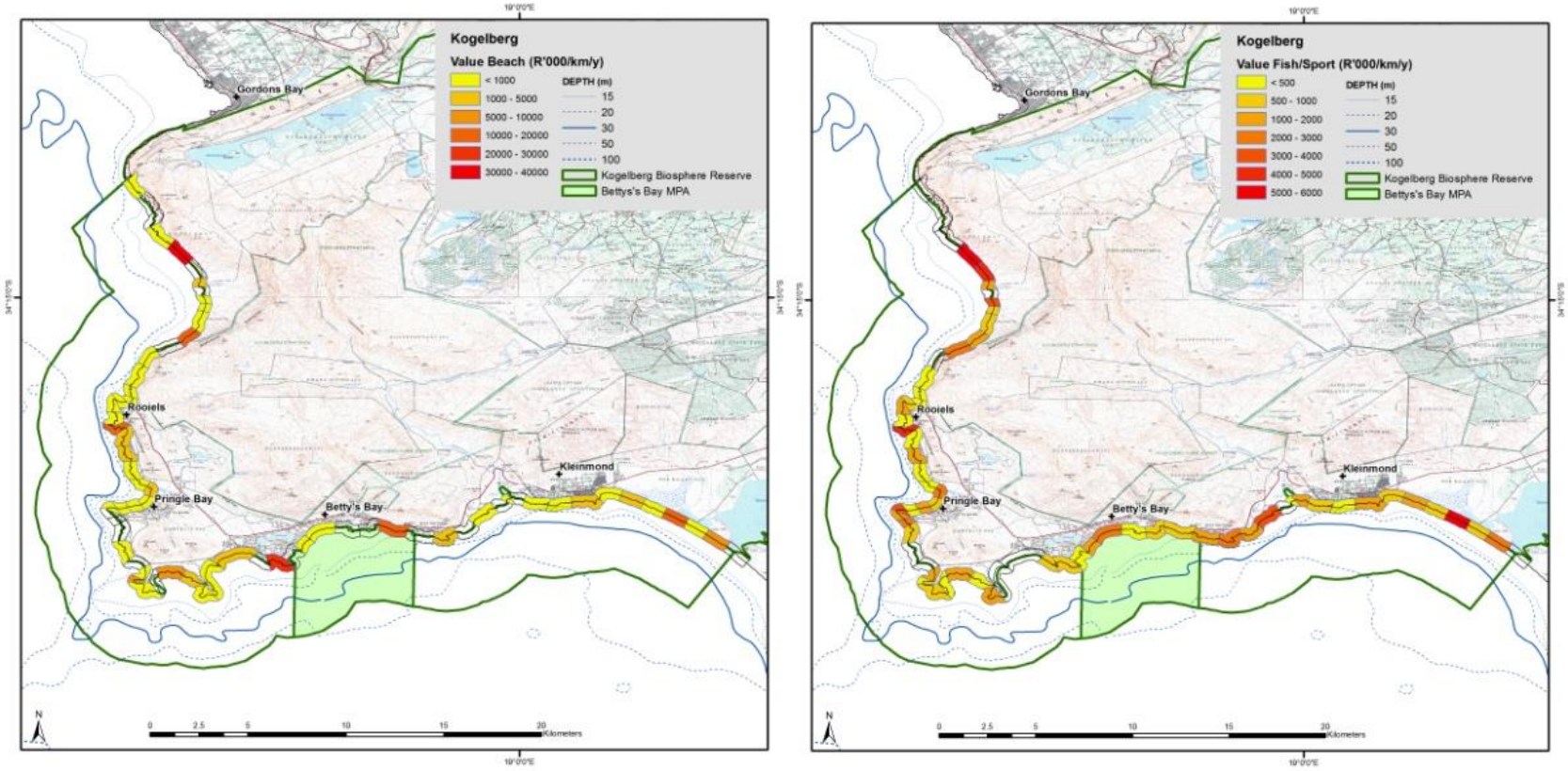
As noted above, the annual visitor days for the Kogelberg area were between 4.2 and 5.3 million. To calculate the overall expenditure attributable to the Kogelberg coast, the first step was to calculate how many of the annual visitor days for the Kogelberg area were shore-based versus water-based days (including fishing activities in the water-based group) for each type of visitor (holiday home owner, overnight and day visitor). The portion of the average expenditure per person per day for the entire trip that could attributed to the visit to the Kogelberg area was estimated based on the percentage reason for the whole trip away that the respondents attributed to Kogelberg. This attributable expenditure pppd was applied to the estimated number of visitor days for each user group (shore-based and water-based visitor days) for each type of visitor (holiday home owner, overnight and day visitor) to estimate the total recreational expenditure attributable to the Kogelberg area. However, not all of this expenditure is attributable to the coast. Therefore, the leisure time that respondents spent on the coast was used to isolate this portion. The recreational expenditure attributable to the Kogelberg coast was estimated at between R191 and 235 million (Table 3).

Table 3. Low and High Range Estimate of Recreational Value Attributable to Kogelberg Coast for User Groups and Visitor Types

	Holiday home owner R000	Overnight visitor R000	Day visitor R000	Total R000
Low range estimate				
Beach	18 955	82 420	20 308	121 683
Fish/watersport	23 038	30 024	15 906	68 968
Total	41 993	112 444	36 214	190 651
High range estimate				
Beach	25 221	98 929	25 037	149 187
Fish/watersport	30 654	36 037	19 610	86 301
Total	55 875	134 966	44 647	235 488

The spread of tourism value along the coast was estimated on the basis of the observed peak-season spread of users in the two main user groups (Figure 6). Value is centered around major beaches and settlements. Value for the beach-based visitors is more concentrated around these points. The value for fishing and water sports is more evenly spread along the coast, but clearly influenced by access points.

Figure 6. Estimated Distribution of Tourism Value of the Coast for (a) Beach-Oriented Visitors and (b) Fishing and Water Sport-Oriented Visitors



In addition, two boat-based whale-watching operators visited the area from the nearby town of Hermanus. The number of passengers on boat-based tours increased 10-fold between 2000 and 2004, from 749 to 7 765, and then almost doubled to 13 268 passengers in 2007 (MCM data). Assuming that there was no change in the number of boat-based whale watchers between 2007 and 2009, the total annual turnover of the boat-based whale watching industry in Hermanus was on the order of R7.29 million. International tourists were the highest subscribers to boat-based whale tours, constituting on average 93% of passengers. On average, 19% of whale sightings on boat-based tours were made along the Kogelberg coast, suggesting that the occurrence of whales in the Kogelberg area contributes at least R1.39 million to the total value of the boat-based whale-watching industry.

Property Value

According to the municipal property register, there were 5 811 houses in Kleinmond (50%), Betty's Bay (27%), Pringle Bay (18%), Rooiels (4%) and Hangklip (1%). Those respondents who owned property (n = 387) were also mainly from Kleinmond (34%), Betty's Bay (29%) and Pringle Bay (24%), but the proportion of respondents from Kleinmond was relatively lower than the proportion of houses in this town.

Information for a total of 220 properties was included in the analysis. Most respondents had properties with either sea/estuary frontage (19%) or a view (60%). Of the remaining 21% of properties, 13% were less than 1km from the coast, 8% were between 1km and 5km from the coast, and 0.1% were more than 5km from the coast. Most of the properties had two (25%), three (35%) or four bedrooms (20%).

The average value of the properties was R1.492 million (S.D. R1.081 million). Properties with sea or estuary frontage had a higher average value than other properties, except for properties with six bedrooms or more, where the average value was similar irrespective of the distance from the coast. There was not a noticeable difference in property values between those with and without sea or estuary views. Results of the property value model are given in Table 4. While frontage was a significant determinant of price, distance from the coast was not.

Based on this model, property in the KGR area was estimated to have a total capital value on the order of R7.3 billion, and the total premium associated with coastal proximity was estimated to be about 14% of this, or just over R1 billion. This translates to an estimated annual turnover of about R59 million in the financial and property sectors (Table 5). The estimated distribution of this value is shown in Figure 7.

Table 4. Regression Results for Property Value (in R millions)

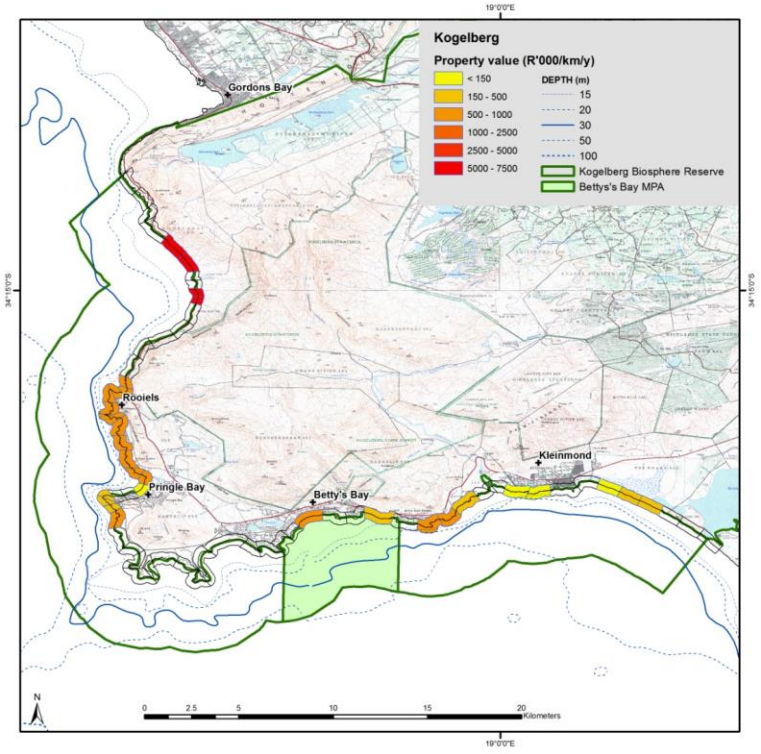
Overall model n = 220, R^2 = 0.29, P < 0.0001.

	Coefficients	Standard Error	t Stat	P-value
Intercept	13.397	0.091	147.847	<0.001
Bedrooms	0.187	0.022	8.337	<0.001
Frontage (1 or 0)	0.300	0.078	3.865	<0.001
Distance from coast (km)	-0.026	0.028	-0.929	0.354

Table 5. Estimated Contribution of the Coast to Economic Output in the Financial and Property Sectors

	Total property value (R millions)	Premium (R millions)	Cost of capital (R millions)	Annual inc to property sector (R millions)	Total turnover (R millions)	Value attributed to adjacent coast (R/km/y)
Rooiels	263	37	11.6	1.6	13.2	819 887
Pringle Bay	1 441	248	25.4	3.6	28.9	5 040 893
Hangklip area	71	10	0.5	0.1	0.6	117 410
Bettys Bay	1 986	231	12.4	1.7	14.2	4 294 621
Kleinmond	3 536	507	1.9	0.3	2.1	560 421
Total	**7 297**	**1 035**	**51.8**	**7.2**	**59.0**	

Figure 7. Estimated Property Value of the Coast (Note Values are R not R'000's)



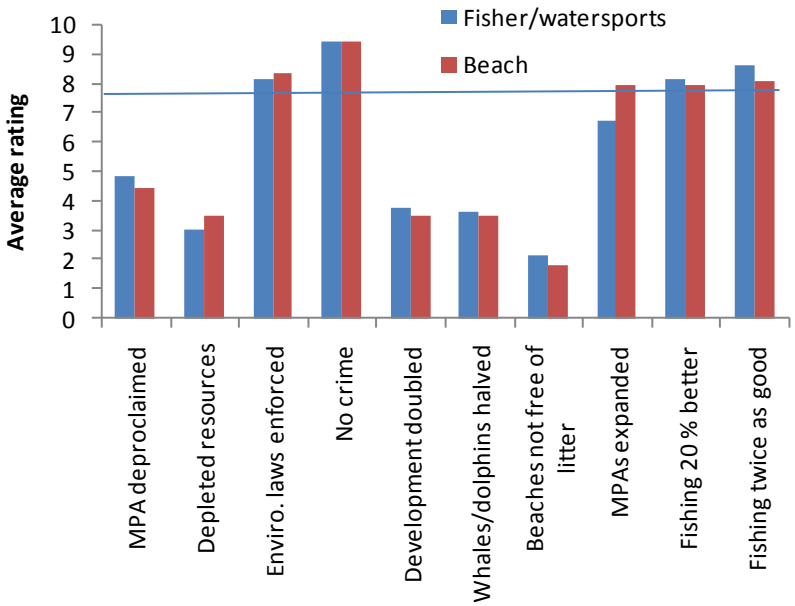
Impacts of Changes in Management

Impacts of Changes on Utility

When respondents rated the recreational value of the coast under the different scenarios, the average score for the status quo was 7.8. Having the coast free from crime (average rating of 9.4), having fishing twice as good (8.3) and ensuring that the laws were enforced for vehicles, boats and fishing (8.2) achieved the highest ratings (Figure 8). Most respondents (87%) gave the no-crime scenario the highest score of all the scenarios.

There was no significant difference between the scores given by the two main user groups of the coast (Figure 8). Nevertheless, as might be predicted, the beach-oriented group gave the three MPA scenarios similar scores irrespective of their impact on fishing, whereas the fishing and water sport-oriented group scored the MPA lower when there was no mention of associated benefits, but responded favourably when given the same scenario with a positive effect on fishing in the remaining areas.

Figure 8. Average Rating of Different Scenarios Relative to Current Score (Shown as Line) for the Coast on Recreational Value (n = 708)



The overall utility rating (on a scale of 0 to 10) among the existing user group was positively influenced by the size of the MPA, fish resources, abundance of cetaceans and law enforcement, and negatively affected by increased development, crime and litter (Table 5).

Response to a Change in Utility

The majority of respondents indicated that, if their preferred scenario were implemented, it would have a positive impact on either their property value, in the case of home owners, or the amount of time spent in the area, in the case of visitors, with 73% of permanent residents, 83% of holiday home owners, and 74% of overnight and day visitors indicating a positive impact (as opposed to no change). Property owners estimated an average increase in property value of 25.8% and visitors an average 29.9% increase in time spent in the area per unit increase in utility (Table 6).

Ten percent of both permanent residents and holiday home owners indicated that they would sell their properties if their worst-case (lowest scoring) scenario came about, while 35% of overnight visitors and 25% of day visitors would stop coming to the area under such a scenario. A substantial percentage (54% of permanent residents, 66% of holiday home owners, 43% of overnight visitors and 60% of day visitors) indicated that, if their least preferred scenario came about, it would decrease their property value (in the case of property owners) or decrease the amount of time spent in the area (in the case of visitors). Property owners estimated an average decrease in property value of 5.3% and visitors an average 7.1% decrease in time spent in the area per unit decrease in utility (Table 6).

Table 6. Generalised Linear Model Results

	Coefficient	St Error	Wald statistic	p
Intercept	0.355	0.075	22.29	<0.001
MPA	0.351	0.022	263.49	<0.001
Fish resources	0.279	0.013	440.81	<0.001
Houses	$1.16*10^{-4}$	0.000	365.83	<0.001
Whales	0.585	0.031	367.00	<0.001
Laws (if weak)	-0.125	0.007	286.74	<0.001
Crime (if high)	-0.192	0.007	820.79	<0.001
Litter (if none)	0.599	0.028	472.59	<0.001
Scale	2.809	0.023	15546.00	<0.001

Note that all co-efficient signs are as expected.

Respondents were asked to express their WTP for their best and worst scenarios. As predicted, the WTP per unit change in utility was higher for the improved scenarios, suggesting that true utility was proportionally greater in the scores above the average score for the status quo. The average willingness to pay by all property owners (permanent residents and holiday home owners) for their preferred scenario was R78 per month, while overnight and day visitors

were willing to pay R33 and R20 per day respectively. The average willingness of property owners to pay to prevent their least preferred scenario was R60 per month, while visitors were willing to pay R28 per day. For property owners, WTP was 6 times higher per unit increase in utility than per unit decrease. For visitors, it was 3 times higher (Table 6). This difference probably arose because property owners scored the status quo higher, and therefore had a smaller range of possible increase in scores.

Of the respondents who were not willing to pay to prevent their least preferred scenario (n = 152), 30% did not advance a reason for not being willing to pay. The most common reasons for not being willing to pay were a belief that it is the government's or municipality's responsibility (28%); not having enough money (13%); being visitors to the area (11%); and already paying taxes (9%). Several other responses were not statistically important but are nonetheless interesting; these included the opinion that there is no guarantee that the money will be used for the purposes provided, that time rather than money could be contributed, and that money would be provided to a new manager but not to the existing authorities.

Estimating Impacts on Value

The total current recreational value of the coast was estimated to be on the order of R272 million per annum, based on the average of the upper and lower bounds of tourism and property values. The respondents' stated willingness to pay suggests that the aggregate willingness to pay to achieve maximum utility (~10) was on the order of R51 million, and to prevent the worst case scenario (utility of ~1) was R53 million (Table 6). This revealed the aggregate strength of their preferences (e.g., people would be willing to pay on the order of R53 million per year to eradicate crime), but not necessarily how the value of the coast might change. What was potentially more revealing was the respondents' estimates of how property values and visitation time would change (Table 7).

Alternatively, if the scores presented by the respondents for the different management scenarios represented their relative potential utility (the level of satisfaction that could be gained), then this would also suggest that the above scenarios could be valued in terms of the proportional change in value. However, because the respondents were limited to scoring improved scenarios on a scale with a maximum of 10 points, their responses could not reflect whether a scenario actually increased its score beyond 10 relative to the current score. This effect was corrected by scaling utility to current value using the relative value of utility (ratio of WTP per unit increase vs. decrease) suggested in Table 6. The results of this method yielded results similar to those based on predicted behavior, but revealed that the change in behavior was not as

great as the change in utility associated with a worse scenario. For example, if fishery resources were decreased, peoples' utility would be substantially affected, as suggested by their WTP to prevent such an occurrence, but their behaviour in terms of the amount of visits to the area would not be as greatly affected.

Results of the above methods suggest that depleting the fishery resources to very low levels could reduce the overall economic value of the area by more than half, to R82 million, and doubling available resources could lead to an increase in value by some R37 million (Table 8). Eradication of crime could potentially increase tourism expenditure in the area by as much as R126 million per year, while a doubling of litter could reduce tourism expenditure by as much as R107 million.

Table 7. Respondents' Estimated Impacts on Property Value, Time Spent in the Area and WTP Per Unit Change in Utility

	Property owners			Visitors		
	Per unit increased utility	Per unit decreased utility	Ratio incr:decr	Per unit increased utility	Per unit decreased utility	Ratio incr:decr
% change in property value / time spent visiting	25.8	-5.3	4.9	29.9	-7.1	4.2
WTP (R) to achieve/ prevent	11.83 pppm	1.87 pppm	6.3	4.90 pppd	1.65 pppd	3.0
Aggregate WTP (R million) per year/unit utility	0.835	0.132		23.379	7.860	
Aggregate WTP(R million) /y for average change	1.473	0.863		49.417	52.300	

Table 8. Estimated Change in Tourism Value from the Status Quo (R272 Million Per Annum) in Terms of Utility and Expenditure, under Different Scenarios

Scenario	Ave Utility Score	Rescaled utility based on relative WTP per unit		Change in value (utility) (Rm/y)	Change in value (spend) (Rm/y)
		Property	Tourism		
Status quo (SQ)	7.8	7.8	7.8		
SQ + MPA deproclaimed	4.6	4.6	4.6	-112	-59
SQ +Depleted resources	3.3	3.3	3.3	-157	-82
SQ +Enviro. laws enforced	8.2	10.4	9.0	58	34
SQ +No crime	9.4	17.9	12.6	211	126
SQ +Development doubled	3.6	3.6	3.6	-147	-77
SQ +Whales/dolphins halved	3.6	3.5	3.5	-147	-77
SQ +Beaches not free of litter	1.9	1.9	1.9	-205	-107
SQ +MPAs expanded (SQ + 2xMPA)	7.4	7.4	7.4	-12	-7
SQ + 2xMPA + Fishing 20 % better	8.0	9.0	8.3	27	15
SQ + 2xMPA + Fishing 2x as good	8.3	10.8	9.2	64	37

Discussion

The analysis estimated the marginal change in utility due to each of the parameters considered, providing the means to model a scenario in which multiple attributes are changed. This can be used to address the extent to which overall utility could be improved compared to the status quo. In the future, the model could be used to estimate utility under combinations of changes other than the scenarios presented to respondents in this study. It allows one to explore how utility can be maximized subject to defined constraints.

The Kogelberg area is a popular tourist destination, particularly with Western Cape residents, but also draws visitors from other provinces and overseas. Residents and visitors were relatively wealthy, with 40% having household monthly incomes in excess of R16 000. The population was estimated to increase by about three-fold during peak holiday periods. Holiday home owners spent most of their holiday in the Kogelberg area and stayed for longer than other overnight visitors. Day visitors, especially from the Western Cape, made up a significant proportion of total visitor days in the area.

For most South African visitors, coming to the Kogelberg area was the main reason for their trip away from home, but it was a less important reason for overseas visitors, who were generally on broader-based sightseeing trips. The majority of South African visitors had visited the area previously, suggesting a high repeat rate of visitors. The area is not just popular because of its proximity to Cape Town; users rated the recreational value of the Kogelberg coast highly in comparison to other coastal areas in the country.

Coastal cleanliness and bathing safety were rated as the most essential attributes that had attracted them to this part of the coast in particular. The terrestrial environment (geographic features and terrestrial nature) and marine wildlife were the next highest drawcards. While the villages and facilities were not the main attractions, they significantly enhanced the recreational attraction of the coast. Sea conditions, which are often rough and dangerous in this area, were not very attractive to visitors, nor were farming landscapes, although this is probably largely due to their relative rarity along this part of the coast rather than to their being unattractive. The MPA and its penguin colony were not major influences in attracting visitors to the area.

Visitors to the area participated in a range of coastal activities, both in the water and on the shore, with the majority of leisure time in the area spent on the shore, in the water or in sight of the shore or sea. Non-coastal activities, including relaxing at home, shopping and going to restaurants, were of lesser importance but still added substantially to the visitor experience.

The overall tourism and property values of the coast were estimated to be on the order of R213 million per annum and R59 million per annum, respectively. The accuracy of these estimates depends on the accuracy in estimation of visitor numbers as well as the reliability of the survey data collected. Nevertheless, the numbers are within the expected order of magnitude. The spatial representation of this value was dependent on limited data on the use of the coast. The peak season was chosen in order to maximize the probability of finding users and under the assumption that the high season distribution mirrors the low season distribution. While the results appear realistic in their overall pattern, there are short stretches of coast that are assigned zero values. However, it is unlikely that there are areas of coast that are never visited.

Residents' and visitors' concerns about crime in the area were reflected in the overwhelming majority indicating that having the coast free from crime was the most preferred scenario that would add to the recreational value of the coast. Other important factors and concerns to emerge were litter on the beaches, development along the coast, improved fishing conditions and enforcement of laws for vehicles, boats and fishing. Respondents indicated a willingness to pay to achieve improvements or prevent deterioration. More importantly, they indicated that changes in utility that would result from different management changes along the coast would result in a change in their visitation rates and property investment and value, directly affecting the value of the coast.

References

Bin, O., and S. Polasky. 2002. Valuing Coastal Wetlands: A Hedonic Property Price Approach. Working paper (September). Available at http://www2.ncsu.edu/unity/lockers/users/v/vksmith/opportunites/Bino%20100102%20seminar%20paper.pdf

Bishop, R.C., P.A. Champ, and D.J. Mullarkey. 1995. "Contingent Valuation." In *The Handbook of Environmental Economics*, edited by D.W. Bromley. Cambridge: Blackwell Publishers, pp. 629-654.

Bockstael, N.E., K.E. McConnell, and I.E. Strand. 1991. "Recreation." In: *Measuring the Demand for Environmental Quality*, edited by J.B Braden and C.D. Kolstad. Elsevier Science Publishers B.V., pp. 227-270.

Bolitzer, B., and N.R. Netusil. 2000. The Impact of Open Spaces on Property Values in Portland, Oregon. *Journal of Environmental Management* 59: 185-193.

Boxall, P.C., W.L. Adamowicz, J. Swait, M. Williams, and J. Louviere. 1996. A Comparison of Stated Preference Methods for Environmental Valuation. *Ecological Economics* 18: 243-253.

Hangklip Kleinmond Tourism Bureau (HKTB). 2009. Harold Porter National Botanical Gardens Visitor Numbers 1995 – January 2009.

Hobden, D.W., G.E. Laughton, and K.E. Morgan. 2004. Green Spaces Borders - A Tangible Benefit? Evidence from Four Neighbourhoods in Surrey, British Columbia, 1980-2001. *Land Use Policy* 21: 129-138.

Kulshreshtha, S.N., and J.A. Gillies. 1993. Economic Valuation of Aesthetic Amenities. A Case Study of River View. *Water Resources Bulletin* 29: 257-267.

Mackenzie, J. 1993. A Comparison of Contingent Preference Models. *American Journal of Agricultural Economics* 75: 593-603.

Mahan, L.M., S. Polasky, and R.A. Adams. 2000. Valuing Urban Wetlands: A Property Price Approach. *Land Economics* 76: 100-113.

Mitchell, R.C., and R.T. Carson. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington D.C.: Resources for the Future.

Pearce, D.W., and R.K. Turner. 1990. *Economics of Natural Resources and the Environment.* London: Harvester Wheatsheaf.

Price, C. 2003. Quantifying the Aesthetic Benefits of Urban Forestry. *Urban Forestry and Urban Greening* 1: 123-133.

Russell, C.S. 2001. *Applying Economics to the Environment*. New York: Oxford University Press.

Shultz, S., J. Pinazzo, and M. Cifuentes. 1998. Opportunities and Limitations of Contingent Valuation Surveys to Determine National Park Entrance Fees: Evidence from Costa Rica. *Environment and Development Economics* 3: 131-149.

Stevens, T.H., R. Belkener, D. Dennis, D. Kittredge, and C. Willis. 2000. Comparison of Contingent Valuation and Conjoint Analysis in Ecosystem Management. *Ecological Economics* 32: 63-74.

Turpie, J.K., Savy, C., Clark, B. and Atkinson, L. 2005. *Boat-based whale watching in South Africa: an economic perspective.* Report to DEAT: Marine and Coastal Management. Anchor Environmental Consultants, Cape Town.

UNEP. 1995. Middle East Peace Multilateral Working Group on Water Resources. Training Course on Project Design and Appraisal Tools for Integrated Environmental and Economic Assessment. Nairobi, Kenya.