

**EXAMINING THE FEASIBILITY OF INTRODUCING ENVIRONMENTAL
SURCHARGES TO FINANCE LOCAL COASTAL MANAGEMENT
INITIATIVES IN SOUTH AFRICA: A CASE STUDY IN PLETTENBERG
BAY**

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I, **David G.R. Mollatt**, do hereby declare that this dissertation which is submitted to Rhodes University for the degree of Master of Economics has not been previously submitted by me for a degree at any other university, that it represents my own work both in conception and execution, and that all the sources that I have used and quoted have been indicated and acknowledged by complete reference.

David G. R. Mollatt

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ABSTRACT

The management of coastal resources in South Africa has come under review as a result of the degradation of environmental resources along the coast. The challenge being faced by resource managers is to achieve economic growth while sustaining South Africa's coastal resource base (Nobel, 2000). The South African government (RSA, 2000) has developed a coastal management strategy to meet this challenge: The strategy involves the inclusion of all stakeholders in the formation of policy regarding the management of coastal resources, in a more integrated approach to coastal management. To effectively achieve this stakeholder inclusion, it has become necessary to decentralize the political, administrative and fiscal authority to conduct coastal management functions. With regard to the need for fiscal decentralisation this thesis considers the possibility of implementing localised environmental surcharges to finance coastal management initiatives.

The ability of the White Paper for Sustainable Coastal Development (RSA, 2000) to provide the formal institutional structure necessary for the introduction of environmental surcharges is first considered. It is shown that the decentralised management strategy has the potential to create a management style that is transparent and accountability orientated. In addition to this the style is capable of adapting to dynamic local coastal conditions and is therefore an appropriate direction in which to steer coastal management in South Africa.

The effectiveness of coastal co-management as an informal institutional arrangement is then examined. Provided that local Coastal Management Fora are created to include all relevant stakeholders and that a source of long term financing is secured co-management has the potential to create the conditions necessary for effective coastal management.

With regard to a source of long term financing, local environmental surcharges to finance coastal management initiatives are considered. The public's willingness to contribute to such a surcharge is analysed in the context of Plettenberg Bay by probing their willingness to pay (WTP) for a Bay Management Plan. A survey instrument is developed to measure the public's WTP. The design of the instrument is based on the Contingent Valuation (CV) method that is used to analyse the non-market benefits that environmental resources (such as Plettenberg Bay) provide the public.

It is found that the resident population is willing to pay R15 per month toward a Bay Management Plan whilst domestic and foreign tourists respectively are willing to pay R6 and R22 daily. The aggregation of these WTP estimates yields a total passive use value of between R15 397 900 – R20 330 500 annually. This nuclear value of the Bay should be included in the formation of local

coastal management policy and provides guidance for the introduction of a local environmental surcharge.

A budget for a Bay Management Plan is proposed and a progressive surcharge based on municipal property value is set. To finance the local residents' share of the budget, a monthly surcharge of R1 would be required of the average valued property. To calculate the domestic and foreign tourist contribution to the budget a schedule of accommodation offering property will be required. However, to finance the entire budget a residential surcharge of approximately R10 would be required of the average valued property. This figure is well below the average resident population WTP of R15, highlighting the fact that an environmental surcharge in Plettenberg Bay is indeed feasible. The difference in reported WTP and the contribution required to finance the Bay Management Plan also highlights that there is scope for experimentation in the introduction of such a surcharge.

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INTRODUCTION

The fate of coastal resources world-wide is becoming evermore uncertain as the spectrum and volume of coastal resource users increases. The management of such resources has become a highly debated issue and has received much international attention, manifesting itself most recently in the form of a paradigm shift in coastal management. The shift has been toward sustainable development as a means to achieve a balance between economic growth and the exploitation of the coastal resource base (Nobel, 2000). The South African Government's coastal management policy stance comes in the form of the White Paper for Sustainable Coastal Development (RSA, 2000), which calls for the inclusion of all stakeholders in the coastal management decision-making process. Fundamental to the new management style is the devolution of management functions to the lowest tier of government that can effectively carry out these functions (Glavovic, 2000) and to achieve this devolution a process of political, administrative and fiscal decentralization has begun. In light of the need to carry out fiscal decentralization, the purpose of this thesis is to explore the feasibility of introducing localized environmental surcharges to finance coastal management initiatives. To fully examine the feasibility of such a surcharge it is necessary to answer the following research question that consists of three key aspects:

First, is it possible to introduce a local environmental surcharge within current formal institutional arrangements in South Africa? In other words does the White Paper for Sustainable Coastal Development allow for local governments to generate revenue on a local scale for coastal management by raising an environmental surcharge? Second, does the new participatory style of coastal management provide the informal institutional arrangement necessary for successful coastal management in South Africa? Finally, and of particular relevance to the practical implementation of a local environmental surcharge, is the public willing to pay such a surcharge, and if so, how much? This thesis sets about answering these questions in the context of Plettenberg Bay in the following way:

Plettenberg Bay is world renowned for its scenic beauty and the aesthetic appeal of the Bay has provided the basis for the development of flourishing tourism and property development industries in the area. Chapter one provides an overview of these industries as well as a socioeconomic baseline for the Plettenberg Bay Municipal area. This highlights the need to

maintain the Bay in its current environmental state and provides the social and economic basis for the introduction of an environmental surcharge to finance a Bay Management Plan.

Chapter two then analyses the formal institutional structures currently in place for coastal management in South Africa in response to the first question posed above. The theoretical considerations for the introduction of an environmental surcharge are then presented and the effects of the introduction of a surcharge on the demand for the Plettenberg Bay recreational experience are examined. In response to the second question posed above, the extent to which co-management will facilitate effective management of coastal resources in Plettenberg Bay is discussed.

Having considered the first two aspects of the research question and shown that in theory the introduction of an environmental surcharge is feasible, it is necessary to explore whether those who use the Bay would be willing to contribute to the surcharge. To this end the value that the public places on the recreational experience that the Bay has to offer must be analyzed. The aesthetic appeal of the Bay provides the basis for the value of the recreational experience, this aesthetic appeal however, is not directly bought or sold in a market and thus does not attract a direct price. It is therefore difficult to place a total value on the Bay. Chapter three provides a survey of literature regarding the valuation of such non-market resources and the estimation of the non-use value that people place on the recreational experiences such as visiting Plettenberg Bay. Non-use (or passive-use) value refers to the value individuals derive from knowing that an environmental resource exists and that it will provide the same utility for future generations as it does for the current generation (Ozuna & Stoll, 1991). In consuming the Plettenberg Bay recreational experience the public does not have to pay for the utility received from this passive use value, as such this value represents what individuals are willing to pay over and above what they currently pay for the experience. This willingness to pay (WTP) is therefore an estimate of the consumer surplus associated with the recreational experience. The practical feasibility of the introduction of an environmental surcharge will depend on the existence and extent of this consumer surplus.

Chapter four draws on the theoretical considerations reviewed in chapter three to develop a survey instrument aimed at estimating the consumer surplus associated with consuming the Plettenberg Bay recreational experience. This is achieved by probing the public's WTP an environmental surcharge to finance a Bay Management Plan in Plettenberg Bay. The

technique followed draws on the Contingent Valuation Method (CVM) in which survey respondents are afforded the opportunity to state their preference toward an environmental resource (in this case Plettenberg Bay and its environmental resources) contingent on a hypothetical market for the resource. The hypothetical market in this study takes the form of a Bay Management Plan and a respondent's WTP to maintain (or improve) the quality of the resource (through the introduction of the Bay Management Plan) represents the existence and extent of consumer surplus. Although the CVM is generally accepted as yielding reliable estimates of WTP, the method is known to suffer from a number of information biases (Arrow, Solow, Portney, Leamer, Radner & Shumar, 1993). Chapter four thus focuses on mitigating the effects of biases such as the 'warm glow' effect associated with individuals purchasing moral satisfaction in stating their WTP. The occurrence of 'free rider' effects and the extent to which individuals are sensitive to the scope of the environmental service provided are also explored (Lee, 1993; Hoevenagel, 1996).

Chapter five will present the data collected in the survey and a model for the public's WTP a surcharge to finance a Bay Management Plan will be developed. The model shall allow for the public's consumer behavior to be contrasted with orthodox consumer theory and thereby test the effectiveness of the survey instrument and the usefulness of the data collected. The aggregation of the WTP data collected will then provide a total annual estimate of the consumer surplus associated with the recreational experience Plettenberg Bay has to offer.

The final chapter provides recommendations for the introduction of an environmental surcharge within the Plettenberg Bay Municipality to finance a Bay Management Plan. The WTP results presented in chapter five provide the economic justification for the introduction of the surcharge as well as a quantitative guide to setting the surcharge. Conclusions regarding the success an environmental surcharge will have in the context of Plettenberg Bay are then drawn.

CHAPTER 1: PLETTENBERG BAY'S LOCAL ECONOMIC PROFILE

1.1 INTRODUCTION

This chapter sets the stage from which the need for this study flows and provides the rationale for undertaking a study of this nature. The chapter begins with a discussion of the importance of South Africa's coastline to those who live around it as well as to the country as a whole, the nature and importance of the Western Cape's Garden Route further contextualizes the study. Plettenberg Bay's particular social circumstances are then highlighted through a socio-economic baseline for the Municipal area and an analysis of the primary industries in the area highlights the structure of the local economy. Finally, the importance of the coast to Plettenberg Bay's economy highlights the need for a Bay Management Plan to ensure that it is developed in a sustainable way.

1.2 THE IMPORTANCE OF SOUTH AFRICA'S COAST

The South African coast stretches from the Namibian to Mozambican borders and includes approximately 3000 km of diverse coastal ecosystems, almost one third of South Africa's population lives at the coast, with the majority living in cities such as Cape Town, Durban, Port Elizabeth and East London. South Africa's coast has historically supported a variety of coastal dependent business activities and "is a place of significant cultural, educational, religious, scientific and spiritual importance" (Glavovic 2000:5). It continues to provide these opportunities but is coming under increasing pressure from unsustainable levels of utilisation. In light of this the benefits currently being enjoyed by the coastal population depend heavily on society's ability to maintain the health and productivity of the coast as a resource. By the same token future opportunities for development and social upliftment also rely on the coast remaining healthy and productive in the future.

1.3 THE GARDEN ROUTE

The Garden Route runs from Cape Town to Port Elizabeth and arguably contains some of the most picturesque sites along the South African Coast. As a result economic activity in the region has tended to concentrate around tourism and holiday related initiatives. In addition to this conservation has taken priority: the region contains the Wilderness Lakes system and protected areas such as the Tsitsikamma National Park and Plettenberg Bay's Robberg

Reserve which incorporate 13% of the coastline (RSA, 2000:20). These factors contribute to the explanation of the region's relative economic success.

Insert 1a: The Garden Route

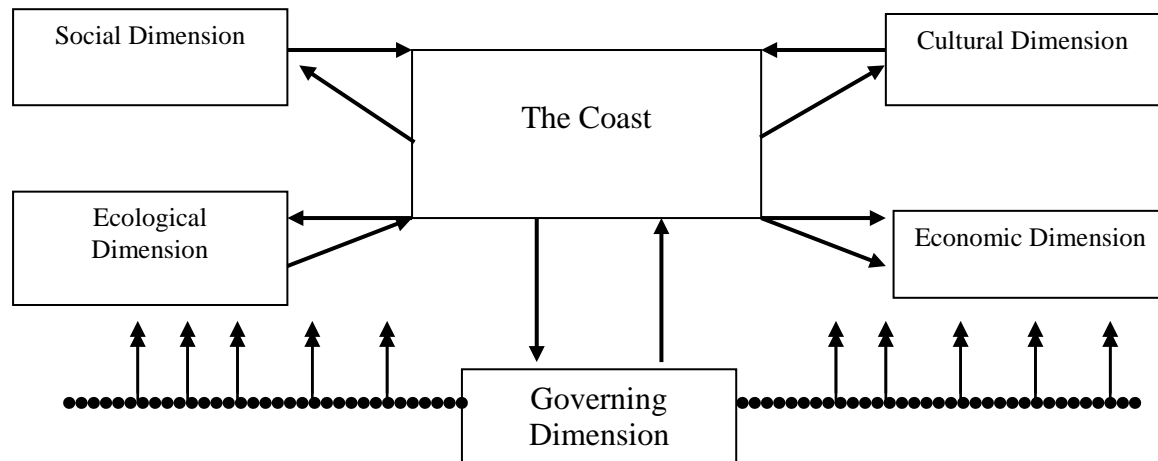


Source: Plettenberg Bay Tourism Home Page

Although the Garden Route economy is focused on tourism and holiday related activities fishing, real estate, forestry, agriculture and petroleum industries are all present and play an important role in the region. However, as is typical of coastal regions countrywide historically disadvantaged individuals face limited access to the resources that contribute to the economic success of the region. In addition to this the nature of the tourism industry is such that many of the jobs in the region are seasonal. This is further aggravated by the fact that residents face increased competition during 'season' by the influx of job-seekers from the Eastern Cape, which is particularly evident in Plettenberg Bay (RSA, 2000:20). The region's reliance on tourism in turn depends critically on the scenic nature of the area, this points to the need to conserve the regions coastal assets to ensure the continued productivity of the area. The White Paper for Sustainable Coastal Development (RSA, 2000) takes this issue further in stating that the natural resource base needs to be managed effectively while creating jobs, dealing with urbanisation and developing the enormous tourism potential of the region (RSA, 2000).

The wide spectrum of opportunities that Plettenberg Bay offers is due to the nature of the bay as a system where land, water and people meet. The relationships that develop amongst these forces mean that the Bay becomes a multi-dimensional system with numerous complicated and delicate interdependencies, as Glavovic (2000) notes, the coast in general is a place of many dimensions:

Figure 1a: The Coast – A multi-dimensional system



Source: Adapted from Glavovic, (2000)

The above diagram illustrates that there are a number of forces at work within the Plettenberg Bay coastal system, following Glavovic (2000):

1. The ecological dimension is where biophysical process associated with land, water and air meet. These elements shape and reshape the bay through tidal, current, wind and wave actions and make surf zone one of the most dynamic geographical zones in the world. This dimension is made up of a diverse range of ecosystems ranging from the Keurbooms estuary and wetlands to the Bay's reefs, sand dunes and beaches.
2. The Bay is as socially diverse and productive as it is ecologically, an intricate spectrum of people from all walks of life meet and interact on a daily basis in the area. It provides a window through which the rest of the world sees and interacts with South Africa in activities ranging from peaceable respite to more active recreational endeavours.
3. Culture adds another complex dimension to the Plettenberg Bay and the South African coast in general; over one hundred thousand years of human history punctuated with the legacy of apartheid and most recently with a more democratic paradigm shift has created a colourful cultural tapestry along the coast. This tapestry manifests itself in

the form of a population speaking a wide range of languages and subscribing to a wide range of traditions, beliefs and practices.

4. The rich social and cultural dimensions to the coastal system imply the occurrence of energetic economic activity, a basic outcome of human social interaction. South Africa's coast is a pillar of the national economy with coastal goods and services accounting for approximately 35% of the country's GDP (McCarthy *et al*, 1998). Economic activity ranges from port and harbour activity to heavy industry, fishing and the increasingly important tourism sector. Tourism is of particular significance to the Plettenberg Bay economy and is discussed in section 1.4 below.
5. All of the dimensions described above are to some degree influenced and guided by the overarching governance dimension. In the governance dimension the coast can be seen as a place where users within the coastal ecosystem come in contact with the people, institutions and protocols involved in the management of the coast.

1.4 A SOCIO-ECONOMIC BASELINE FOR PLETTENBERG BAY

Plettenberg Bay is located at the centre of the garden route and as such can be seen as a typical coastal town in terms of its social structure and economic activity. To highlight the Plettenberg Bay's socio-economic situation a baseline is discussed below and serves the additional purpose of providing a point of comparison for the data collected in the survey phase of this study. By the time this study was complete the most current demographic information available was data from the 1996 Census, this data is relatively old and it could be argued that the demographic profile of Plettenberg Bay has changed since this census. As a result the Census 1996 data has been supplemented with information from the Plettenberg Bay Municipality and Rate Payer's association.

1.4.1 Population Structure

Table 1a provides an indication of the size of the population within the Greater Plettenberg Bay Municipality. The figures show that the majority of the population is made up of people of African origin (41%) and of Coloured origin (40%). The remainder of the population is made up of people of European origin (19%) a negligible percentage of people of unspecified origin and no people of Indian/Asian origin. For this reason all following tables exclude this unspecified portion of the population

Table 1a: Population Structure of the Greater Plettenberg Bay Municipality by Race¹

| Population Group | Municipal Figures | % of Population |
|------------------|-------------------|-----------------|
| African | 28 608 | 41 |
| Coloured | 27 966 | 40.0 |
| White | 13 193 | 19 |
| Indian/Asian | 0 | 0 |
| Unspecified | 56 | 0 ² |
| Total | 69 823 | 100 |

¹ Source PBIDP (2002)² Percentage of population negligible

Table 1b draws on Census 1996 data to provide a profile of population of Plettenberg Bay Town according to race and working age group (WAG). The data is presented in percentage form to facilitate a comparison between the different races and age groups.

Table 1b: Demographic Profile of Plettenberg Bay Town showing the percentage by race of people within the working category

| Percentages by Race Group | | | | | |
|--------------------------------|----------------|--------------|--------------|--------------|--------------|
| Age Group | African Origin | Coloured | White | Unspecified | Total |
| 0-5 | 11.4 | 11.7 | 5.4 | 15.3 | 9.9 |
| 6-10 | 7.8 | 10.4 | 5.1 | 12.0 | 8.0 |
| 11-15 | 7.0 | 10.8 | 4.6 | 12.7 | 7.7 |
| 16-20 | 9.8 | 10.3 | 3.5 | 10.0 | 8.3 |
| 21-25 | 16.3 | 8.8 | 4.5 | 6.7 | 10.6 |
| 26-30 | 14.7 | 8.8 | 6.0 | 8.0 | 10.4 |
| 31-35 | 10.6 | 8.9 | 6.5 | 3.3 | 8.7 |
| 36-40 | 7.4 | 7.3 | 6.1 | 7.3 | 7.0 |
| 41-45 | 4.9 | 6.7 | 5.9 | 5.3 | 5.8 |
| 46-50 | 3.0 | 4.2 | 6.1 | 2.0 | 4.2 |
| 51-55 | 2.0 | 3.4 | 7.0 | 2.7 | 3.8 |
| 56-60 | 2.0 | 2.1 | 7.5 | 4.0 | 3.5 |
| 61+ | 2.1 | 4.7 | 27 | 6.0 | 9.5 |
| Unspecified | 0.9 | 1.9 | 4.9 | 4.7 | 2.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Working Age Group (WAG) | 68.8 | 58.4 | 45.7 | 45.3 | 59.0 |

Source 1996 Census Data

Table 1b shows that 69% of the African population falls into the working age group, the highest proportion amongst the races, with the white population having only 46% falling within the working age group. This is due to the high proportion (27%) of this population falling above the 61-year-old mark. This in turn is in keeping with the fact that Plettenberg Bay is seen as a prime retirement location for pensioners from around the country (and increasingly the world).

1.4.2 Income Distribution

Table 1c illustrates a marked income distribution pattern common in many coastal communities. Over 90% of the African community falls within the first and second income quartiles, with a figure of over 79% for the coloured community. This is in contrast to the high proportion (72%) of the white community that falls into the top two income quartiles.

Table 1c: Plettenberg Bay Population by Income Quartile and Race

| Income Quartile | Q1 | Q2 | Q3 | Q4 | Total |
|-----------------|-------------|-------------|-------------|-------------|--------|
| Race | | | | | |
| African Origin | 39.7 | 51.1 | 7.9 | 1.2 | 100.00 |
| Coloured | 34.9 | 44.7 | 15.3 | 5.2 | 100.00 |
| White | 8.6 | 18.6 | 34.7 | 38.2 | 100.00 |

Source 1996 Census Data

1.4.3 Indicators Of Employment

Table 1d shows relatively high extended labour force participation figures for all race groups. This is in keeping with municipal figures of unemployment which site Plettenberg Bay unemployment to be a rate of 14% which is low in relation to the Western Cape aggregated figure of 17.3% and even lower in relation to the national figure of 37% (PBIDP, 2002). In keeping with this trend, Le Roux¹ (2003) notes the seasonal fluctuation in eco-tourism activities is becoming less apparent with the season extending after January and beginning before December. It can thus be seen that the tourism sector has a significant positive effect on employment in Plettenberg Bay, this in turn points to the need to ensure that the environmental resources that facilitate tourism activities in the area are managed effectively.

¹ Plettenberg Bay Tourism Bureau

Table 1d: Employment status by Race including the percentage of the labour force and labour force participation rates in Plettenberg Bay.

| Percentage of Race Group | African | Coloured | Indian/Asian | White | Unspecified | Total |
|---|--------------|--------------|--------------|--------------|--------------|--------------|
| 1 Employed | 54.1 | 56.9 | 41.2 | 58.8 | 36.8 | 55.7 |
| 2 Unemployed, looking for work | 22.9 | 14.4 | 29.4 | 2.3 | 14.9 | 15.8 |
| 3 Not working - not looking for work | 1.7 | 1.6 | 0.0 | 0.5 | 4.6 | 1.4 |
| 4 Not working – housewife/home-maker | 1.5 | 5.9 | 5.9 | 12.9 | 2.3 | 5.3 |
| 5 Not working – scholar/full-time student | 12.0 | 11.4 | 11.8 | 5.7 | 5.8 | 10.4 |
| 6 Not working – pensioner/retired person | 2.6 | 3.9 | 11.8 | 16.6 | 6.9 | 5.9 |
| 7 Not working – disabled person | 0.6 | 1.9 | 0.0 | 0.2 | 4.6 | 0.9 |
| 8 Not working - not wishing to work | 0.5 | 0.2 | 0.0 | 0.3 | 0.0 | 0.3 |
| 9 Not working – none of the above | 4.2 | 3.9 | 0.0 | 2.8 | 24.1 | 4.1 |
| 0 Unspecified | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Conventional Labour Force(CLF) 1+2 | 76.9 | 71.2 | 70.6 | 61.1 | 51.7 | 71.5 |
| Extended labour Force (ELF) 1+2+3 | 78.6 | 72.8 | 70.6 | 61.6 | 56.3 | 72.9 |
| Working Age Group (WAG) 16-55 yrs | 68.8 | 58.4 | 59.6 | 45.7 | 45.3 | 59.0 |
| Labour Force Participation (LFP) | 81.4 | 78.2 | 38.7 | 67.3 | 66.2 | 77.1 |
| Extended Labour Force Participation (ELFP) | 83.2 | 79.7 | 38.7 | 67.8 | 72.1 | 78.7 |

Source 1996 Census Data

The relatively high employment figures can plausibly be explained by the fact that a relatively high proportion of the population falls into the semi-skilled and middle service categories of the availability and classification of skills. In conjunction with this the retail sector of the economy has shown good growth over the last decade, which according to BDM Consulting is due to growth in the tourism sector particularly over the December – January season (Plettenberg Bay IDP, 2002)

1.5 PLETTENBERG BAY TOURISM

1.5.1 Introduction

South Africa's Western Cape is one of the most picturesque areas of the country often called the Jewel of the garden Route. The Jewel of the garden route is a name that becomes quite evident when one experiences the scenery and activities that the Bay has to offer. Insert 1b below typifies the sort of scenic beauty that attracts tourists from around the country and around the world and has made Plettenberg Bay one of the country's prime coastal residential

property locations. The Robberg Reserve is located on the western border of Plettenberg Bay and the sheer peaks of the peninsula cushion the Bay from the harsh South Coast weather. The Tsitsikamma National Park borders the Bay to the east and provides tourists to the area with additional value adding eco-tourism activities, ensuring that the overall recreational experience in the area is second to none.

Insert 1b: Robberg Peninsula (foreground) provides Plettenberg Bay (background) and its inhabitants with shelter from the elements



Source: Plettenberg Bay Tourism Home Page

The diversity and uniqueness of attractions in South Africa along with the increasingly favourable perception of South Africa in the eyes of the international travelling community has seen tourism growth return to the figures experienced in the mid 1990's (Thornton & Feinstein, 2003). In particular the country has seen an 18% growth increase in overseas arrivals and figure of 7% for African arrivals, leading to an increase in total arrivals of 10% in 2002 compared to 2001 (Thornton & Feinstein, 2003). Exact figures on the number of tourists visiting Plettenberg Bay have been particularly difficult to arrive at, as there is no formal system for collecting this information at present. However Le Roux (2003) estimated the number of tourists to Plettenberg Bay in 2002 at a figure of 700 000 and Becke² (2003) estimates the figure to be 950 000. The proportion of domestic to foreign tourists, as used within the tourism industry (Le Roux; 2002), is 65% domestic and 35% foreign. This yields between 455 000 - 617 500 domestic tourists to Plettenberg Bay annually and between

² Chairman Plettenberg Bay Tourism Association, Ratepayers Review, 2003

245 000 – 332 500 foreign tourists choosing Plettenberg Bay as a holiday destination annually. The following tourist data draws from statistics compiled by the South African Tourism Board in addition to data supplied by Plettenberg Bay Tourism, the data is used to characterise tourists to Plettenberg Bay and to provide an indication of the number of tourists that visit Plettenberg Bay each year.

1.5.2 Domestic Tourism To The Western Cape

Domestic tourists to the Western Cape come from all over the country: the majority of all visitors come from the Western Cape itself, this is followed by visitors from Gauteng and then the Eastern Cape. The remaining visitors come from the Northern Cape, NorthWest, Free State, KwaZulu-Natal, Limpopo and Mpumalanga provinces. Table 1e below gives a proportional analysis of visitors to the Western Cape by Province.

Table 1e: Percentage of Domestic Visitors to the Western Cape by Province

| Province | Percentage of Visits (%) |
|---------------|--------------------------|
| Western Cape | 55 |
| Gauteng | 15 |
| Eastern Cape | 10 |
| Kwazulu-Natal | 7 |
| Northern Cape | 4 |
| Free State | 3 |
| Limpopo | 2 |
| North West | 2 |
| Total | 100 |

Source: Thornton & Feinstein 2003

1.5.3 International Tourists To Plettenberg Bay

Plettenberg Bay is also a destination for international tourists from around the world, it is a particularly popular destination for tourists from the United Kingdom (50%) and for tourists from Germany and the Benelux countries (35%) followed by 15% from America, Australia and other countries (Le Roux, 2002). These figures are presented in Table 1f below:

Table 1f: Proportion of International Tourists to Plettenberg Bay by Country of Origin

| Country of Origin | Percentage of International visitors (%) |
|--|--|
| United Kingdom | 50 |
| Germany and Benelux ³ countries | 35 |
| America, Australia and other countries | 15 |
| Total | 100 |

Source: Le Roux (2002)

1.5.4 The Significance of the Tourism Industry

³ Benelux countries include France, Belgium and Holland

With a permanent population of just under 70 000⁴, each year Plettenberg Bay attracts over ten times its population in terms of domestic and foreign tourists. The economy has become increasingly geared towards servicing the tourism market and with tourist numbers set to continue on the current upward trend, the local economy is preparing ever more resolutely to capture the benefits the global tourism industry has to offer (Le Roux; 2003).

1.6 PROPERTY DEVELOPMENT IN PLETTENBERG BAY

As with the tourism industry, the property industry has undergone a dramatic boom in recent years. An indication of the extent of this boom is that between August 2001 and July 2002 alone 441 new building plans were received and approved by the Municipality (Ratepayers Review, 2003). There are currently 47 registered building contractors⁴ and at least 13 registered estate agents⁶ located in Plettenberg Bay. This illustrates the importance of property resale and development to the Plettenberg Bay economy in terms of revenue generation and employment creation.

The fundamental reason for the property boom again stems from the aesthetic appeal of Plettenberg Bay to an ever-increasing number of current and future property owners. The extent of this widespread aesthetic appeal is such that there are currently seven major residential estates being developed in the Plettenberg Bay Municipal area (Ratepayers Review, 2003). Without exception these estates cater for wealthy individuals looking for exclusive property to frequent while on holiday or to live in permanently. In light of this the maintenance of Plettenberg Bay's environmental quality is of major importance to an increasing number of stakeholders. This alone highlights the need for an effective coastal management plan.

1.7 CONCLUSION

The continued upward trend in tourism that has been highlighted in this chapter depends critically on the continued well being of the Bay and its environmental resources and points to the need for a Bay management plan to ensure this well being. This management plan can

⁴ Source: PBIDP (2002)

⁵ Source: PBIDP (2002),

⁶ Source: Ratepayers Review (2003)

thus be seen as an investment insurance policy for those who derive benefit from the Bay through tourism opportunities as well as those who have invested in this area by purchasing coastal property.

The socio-economic baseline along with the tourism statistics and property development information presented above are used to characterise the type of populations that are likely to derive value in some form or another from Plettenberg Bay. These populations, namely Plettenberg Bay locals, domestic tourists and international tourists thus provide the target populations that are analysed in this study. In light of this, the active tourism and property development sectors provide an ideal arena to explore the practicalities involved in financing local coastal management. The need for such research is made clear in the White Paper for Sustainable Coastal Development (RSA, 2000), which calls for the development of coastal management projects that are not only sustainable but also self financing. The following chapters are dedicated to exploring the issues involved in coastal management, the first aspect of which is analysing whether or not the institutional structures required to facilitate coastal management are present in South Africa.

CHAPTER 2: THE FEASIBILITY OF AN ENVIRONMENTAL SURCHARGE IN PLETTENBERG BAY

2.1 INTRODUCTION

The preceding chapter has shown that Plettenberg Bay's economy is highly dependent on the Bay and its environmental resources. Prudent management of these resources is thus vital to ensure the maintenance of their tourism value and the continued development of the local economy. This chapter focuses on local financing and implementation of a Bay Management Plan in the context of Plettenberg Bay.

To this end section 2.2 of this chapter addresses the question of whether it is possible to introduce a local environmental surcharge within current formal institutional arrangements in South Africa. The section also includes an analysis of an alternative coastal management financing option in the form of Local Coastal Fora (LCF). Section 2.3 of the chapter then addresses the question of whether coastal co-management on a local scale provides the informal institutional arrangement necessary for successful coastal management in South Africa. This includes a discussion of coastal co-management successes in South Africa and the conditions required for its effective implementation. Section 2.4 then draws on the preceding sections in providing conclusions regarding the expected success of local financing and implementation of appropriate Bay Management.

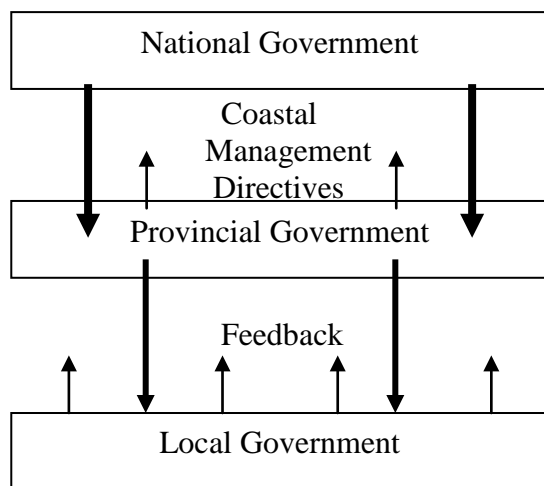
2.2 FORMAL INSTITUTIONAL STRUCTURES FOR COASTAL MANAGEMENT - THE WHITE PAPER FOR SUSTAINABLE COASTAL MANAGEMENT IN SOUTH AFRICA

Figure 1a describes the coast as a multi-dimensional system, the holistic management of the different influences simultaneously poses a formidable management task. To meet this challenge a new coastal policy has been put forward in the form of the White Paper for Sustainable Coastal Development in South Africa (RSA, 2000). The approach aims to achieve the constitutional goal of improving the quality of life for all South Africans. It is based on the fact that in order to reap the social and economic benefits that the coast so readily provides, it is vital to maintain the diversity and health of coastal ecosystems (Glavovic, 2000). The maintenance of the diversity and health of coastal ecosystems in South

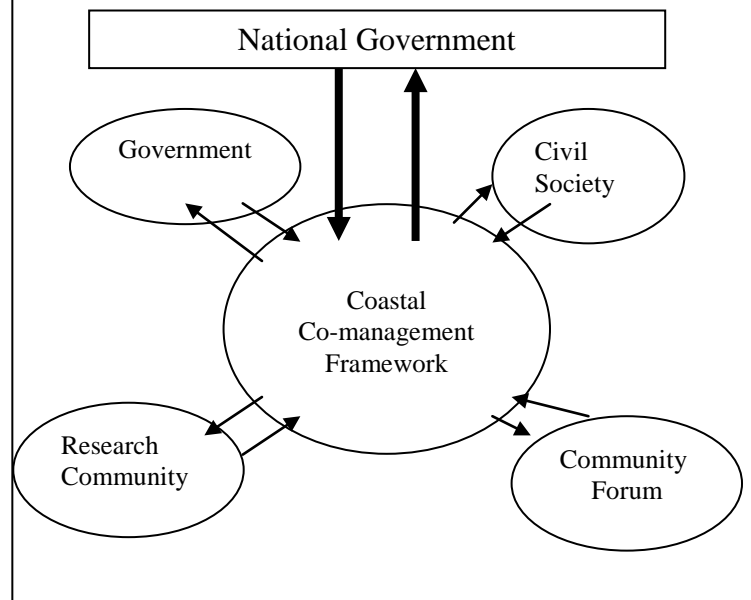
Africa will be achieved through a more integrated approach to coastal management which as Glavovic (2000) notes differs from past management styles in four main ways.

First a holistic mind-set is called for, and is achieved by viewing the coast as a system as opposed to falling into different government departments and sectors (e.g. the old Sea Fisheries⁵, municipalities and Nature Conservation). Second the White Paper emphasises the importance of recognising the value of coastal assets as the basis for coastal management (RSA, 2000). Third the White Paper prescribes a people-centred management approach and highlights the contribution that government, civil society and the private sector can make together to the development of South Africa as a whole. Finally the management style aims to promote shared responsibility amongst the government, civil society and the private sector with the goal of creating a dynamic management structure that is able to adapt, on a local scale, as more is learnt about the coastal system (RSA, 2000:8).

Figure 2a: The New Coastal Management Strategy
Previous Management Style



Integrated Co-management Style



Source: Adapted from Glavovic, (2000)

Figure 2a illustrates that in the past coastal management involved a hierarchical decision making framework in which directives were passed down from national government through

⁵ Sea Fisheries was concerned with the management of fishery resources, excluding other marine and coastal resources

provincial government to local government for implementation. The framework was rigid and unable to cope with the dynamic nature of the coastal system. The weaknesses of the past style have led the White Paper (RSA, 2000) to adopt a more integrated approach to coastal management. Co-management calls for the involvement of civil society, the local community as well as research organisations in the development of coastal management frameworks. The style promotes the development of shared goals and objectives and leads to increased transparency in the management of coastal resources. The inclusion of the local community and research organisations ensures that the management framework is able to adapt to the changing local community needs as well as coastal conditions (RSA, 2000).

The White Paper (RSA, 2000) also recognizes the benefits that the devolution of management functions will have for the implementation of the new integrated coastal management strategy and as such emphasises that such management functions need to be devolved to the lowest sphere of government able to conduct them. The main challenge being faced in this process of devolution is the widespread lack of skills and resources for coastal management amongst sub-national levels of government (Glavovic, 2000).

The introduction of local co-management projects into all coastal provinces is encouraged to meet this challenge. These projects are aimed at providing “tangible examples of the success that integrated coastal co-management can have in achieving sustainable coastal development at the local level” and in the process develop the capacity of local role-players to manage coastal resources (RSA, 2000:104). The financing mechanism through which the White Paper assumes that these projects will be established is that donor funding will be used in the initial phases of the projects to establish a ‘functioning’ model of co-management. This, in time, is expected to lead to increased support for this coastal management strategy and a reprioritisation of national, provincial and local budgets for coastal management activities (RSA, 2000).

This financing mechanism has been developed as a high level ‘all encompassing directive’ which must be interpreted and adapted to suit local coastal conditions. In light of this a modified interpretation of this financing mechanism for coastal management in areas such as Plettenberg Bay is examined. The nature of the coastal economy and the underlying socio-economic conditions may allow for the introduction of a locally administered environmental surcharge to finance capacity building and coastal management initiatives in Plettenberg Bay.

The mechanism at play here would not necessarily require an initial project sponsor in the form of an external agent, instead a ‘bottom up’ approach would see the community providing the financing necessary to finance public environmental services of their collective choice. This immediately sets up the incentive structure that the principles of co-management call for in terms of influencing the behaviour of resource managers to align with the collective interest. This would occur because resource managers would become answerable to the community living around the resource as opposed to a single project sponsor or possibly government at a provincial level. This in turn would lead to a far more transparent and accountability orientated management structure that would be capable of effectively adapting to continuously changing local coastal conditions.

The success of the integrated approach to coastal management will depend on the extent that management functions are devolved to sub-national levels of government. This requires that the processes of political, administrative and fiscal decentralisation occur. Political decentralisation allows sub-national governments to establish their own political structures and to elect their own leaders. Administrative decentralisation refers to the devolution of responsibility for the implementation of policy (which may or may not be accompanied by the ability to be involved in actual policy formation) (Abedian & Biggs, 1998). The ability of the government at a local level to introduce an environmental surcharge depends on the extent to which fiscal decentralisation is possible in this context. The next subsection examines the theoretical considerations underlying fiscal decentralisation.

2.2.1 Fiscal Decentralisation – Towards Increased Allocative Efficiency in The Provision of Public Goods

Fiscal decentralisation is often referred to as fiscal federalism and involves the structure of public finances in a state with more than one level of government (Black *et al*, 2000). The South African Government is made up of national, provincial and local levels of government and the degree to which sub-national government can make decisions on fiscal issues dictates the extent to which fiscal decentralisation has occurred (Abedian & Biggs, 1998). In light of this Tanzi (1996: 297) states that “fiscal decentralisation occurs in situations where sub-national governments have the power, given to them by the constitution or by particular laws, to raise taxes and carry out spending activities within clearly established legal criteria.” In the context of coastal resource management in Plettenberg Bay, this decentralisation refers to the extent that the local government (Plettenberg Bay Municipality) is empowered to generate

funds on a local scale. The extent to which the Municipality can then spend this revenue on the provision of localised public goods and services, a Bay Management Plan for example, is also an important consideration. As noted by Black *et al* (2000), the principal driving force behind decentralised sub-national decision making tends to be political. There is however, sound economic rationale for decentralisation stemming mainly from a decentralised system's ability to improve allocative efficiency in the provision of public goods and services:

The primary motivation for the decentralised provision of environmental services is the occurrence of allocative efficiency through decentralisation. This refers to the extent to which a government provides the mix of public services that a community demands (Abedian & Biggs, 1998). Centralised provision of public services is not always effective in providing these services because of the occurrence of local public goods. Some services, a Bay Management Plan for example, yield benefits that are confined to a specific area. Their provision at a national level therefore would yield inefficiencies as all citizens would be contributing to their provision but only those in proximity to their provision would benefit. The imbalance caused by the provision of local public goods is particularly relevant to the management of coastal resources because the benefits flowing from the provision of public environmental services are often limited to the geographic area in which the service is provided. In addition to this coastal assets such as Plettenberg Bay tend to be biologically unique systems and thus the communities living in the vicinity of such resources will demand different levels of public environmental services.

An important practical consideration in the provision of local public goods is that boundaries of sub-national jurisdictions are often set according to political or historic directives which means that the benefits and costs associated with providing such local public goods may not coincide exactly. This leads to the occurrence of spatial externalities where the benefits from a local public good provided in one municipality are received by communities in another municipality: services with such external benefits will be under-provided because each municipality is fundamentally concerned with the welfare of its electorate. Similarly public goods with external costs will be overproduced as residents of that jurisdiction do not bear the full social cost of such goods (Black *et al*, 2000). However municipal boundaries are often geographically determined by mountain ranges or rivers and estuaries. This supports the argument for the decentralised management of coastal assets in particular as benefits flowing from the provision of public environmental services in one jurisdiction are unlikely to spill

over into a biologically or geographically different jurisdiction. In the context of Plettenberg Bay, a Bay Management Plan would lead to an improvement in the localised marine and coastal resources in the area. It could be argued that some of these resources may migrate into neighbouring areas thereby leading to the occurrence of spatial externalities as people in these neighbouring areas would benefit from the increase in marine resources flowing from the Plettenberg Bay system. Considering that Plettenberg Bay is bordered by the Tsitsikamma National Park to the east and the Robberg Reserve to the west, and that these areas contain well maintained marine resources it would seem unlikely that marine species would migrate to these areas. In fact the Bay Management Plan would more likely correct the externality currently occurring in terms of marine species migrating out of the adjacent (and separately managed) reserves into Plettenberg Bay.

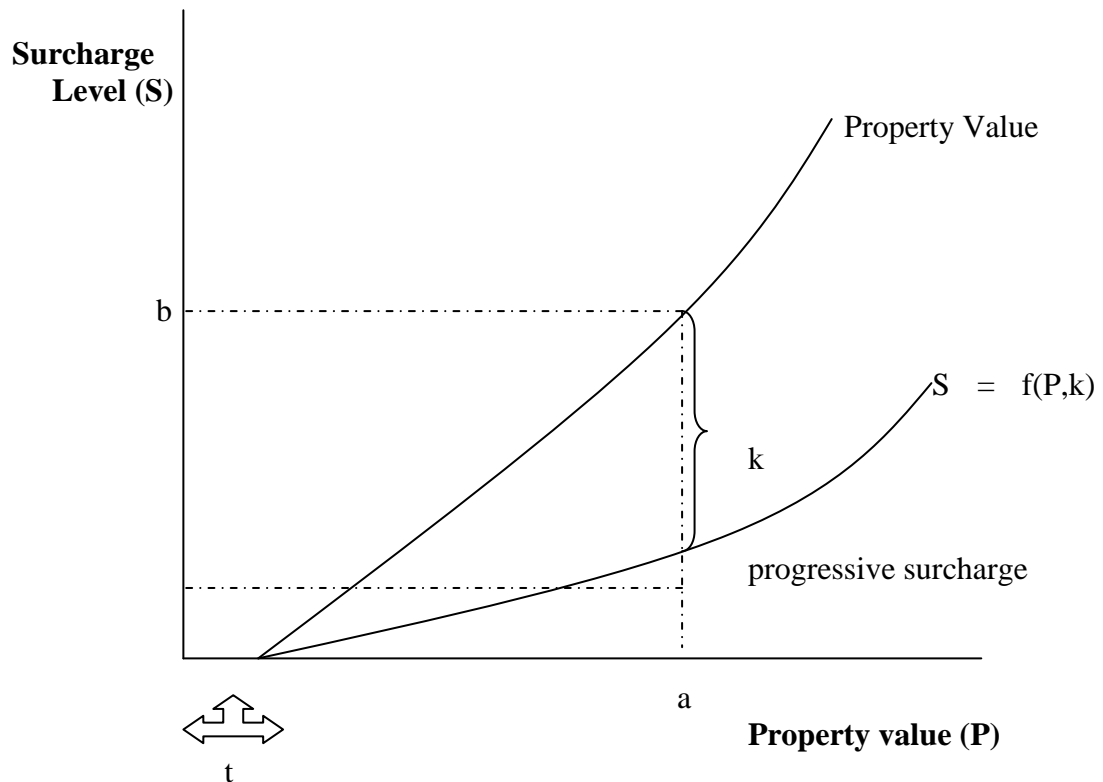
Although decentralising management authority to lower tiers of government has its advantages, in certain situations centralised control is necessary. The occurrence of marine species such as dolphins and whales which migrate on a national and global scale, calls for management at national and global levels to mitigate the geographic externalities that would occur if these marine resources were managed at the local level (Mather & Mollatt 2002). Although present, these geographic externalities are not significant enough to have a damming effect on the case for localised financing and management of Plettenberg Bay. In light of this the implementation of a locally administered environmental surcharge will be feasible in Plettenberg Bay. To this end, Musgrave (1983) notes that taxes on immobile factors of production such as property should be levied by local jurisdictions and at the same time user charges and benefit taxes may also be levied at a local level.

2.2.2 The Implementation Of The Environmental Surcharge

Figure 2a below illustrates the way the environmental surcharge could be implemented. The surcharge is set according to property values in the Plettenberg Bay Municipality: the owner of the average valued property will contribute the average amount required to finance a Bay Management Plan budget when varied across the property value distribution. The constant k represents the percentage of the property value paid by each property owner to arrive at the funds required and the outcome of the introduction of such a surcharge is both progressive and distributive. The progressive aspect of the surcharge ensures that those with the ability to pay more (less) do so according to the value of their property that is used as a proxy for their ability to contribute toward the surcharge. This promotes both vertical and horizontal equity

in that people with different abilities to pay do so, and people with a similar ability contribute a similar amount. As Black et al (2000:205) note equity is a basic requirement of a 'good' tax (surcharge) structure.

Figure 2b: A Progressive Environmental Surcharge



Source: Adapted from Hyman (1999)

where:

- a = property of average value
- b = surcharge on property of average value
- k = factor from which percentage surcharge is calculated
- t = surcharge 'tunnel'

Perhaps the most important aspect of this surcharge is its distributive capabilities; in this analysis sub-economic households (the poorest members of the community) will be excluded from contributing toward the surcharge. The schedule of rateable property in the Plettenberg Bay Municipality excludes sub-economic households and as such a surcharge 'tunnel' t is created. In the pursuance of vertical equity, sub economic households do not contribute to the fund as such households are the most likely to be unable to do so. At the same time, however, these households are not excluded from enjoying the benefits that the provision of the Bay Management Plan will yield. These benefits may flow from merely being able to

enjoy the unspoiled quality of the Bay in the future. More importantly however, is that the provision of the Bay Management Plan at no cost to sub-economic households will provide such households with real and significant opportunities to uplift their socio-economic status through job creation in the growing tourism and related industries. In other words the Bay Management Plan will maintain (and in the long run improve) the quality of the Bay and stimulate further growth in tourism; this in turn will create numerous jobs providing sources of gainful employment for members of the community previously unable to find such opportunities.

2.2.3 The Dynamic Effects of The Introduction of an Environmental Surcharge In Plettenberg Bay – The Tiebout Model of Fiscal Decentralisation

The Tiebout model (Tiebout,1956) analyses the effects of the introduction of an environmental surcharge from a public choice perspective: He (Tiebout, 1956) purported that if there were a large enough number of municipalities (jurisdictions) and if each municipality offered a different mix of local public goods and taxes, then each citizen of that country would reveal their preferences for such goods and taxes by choosing the municipality under whose jurisdiction they were willing to live. In the model the greater the number of municipalities and the wider the spectrum of public goods provided, the closer public good consumers will be to revealing their true preferences for public goods (and taxes). In such a situation citizens are obviously fully mobile and rational in choosing the local government that produces the mix of public goods and taxes that best suits their preferences. The ability for individuals to ‘vote with their feet’ allows them to reveal their preferences by organising themselves into groups of like tastes in terms of public services and their associated taxes. The outcome of this process of ‘voting with one’s feet’ is pareto efficient; an equilibrium situation reached when the benefits received by one individual do not impose a cost on or detract from the benefits received by another (Abedian & Biggs, 1998).

In the context of Plettenberg Bay the Tiebout model is particularly relevant to the behaviour of tourists to the area. Tourists would be required to contribute toward the environmental surcharge and thus their preferences toward the Bay Management Plan would be revealed by their decision to visit Plettenberg Bay or not. They could choose to visit the area and contribute toward the surcharge while enjoying the benefits that the Bay Management Plan provides or they could choose to travel to alternative destinations along the coast which provide different mixes of public environmental services and taxes. The same mechanism

applies to residents of Plettenberg Bay but to a lesser extent as such individuals are less mobile than tourists to the area. The public's ability to vote with its feet is thus an important consideration in the potential introduction of an environmental surcharge in Plettenberg Bay.

If set too high the surcharge has the potential to dramatically reduce the base from which to collect revenue as tourists (and potentially residents) may go elsewhere along the coast to areas which better suit their preferences in terms of public environmental services and taxes. On the other hand the introduction of a Bay Management service may provide the public with a mix of public services that has until now been unavailable to them. However, research has shown [for example Navrud & Mungatana (1994) and Shrestha *et al* (2002)] that environmental resources, such as Plettenberg Bay are often undervalued. As a result of this there is often significant consumer surplus associated with the environmental goods. This consumer surplus is measured by analysing the public's willingness to pay additional amounts to enjoy the same benefits from these goods. To effectively introduce an environmental surcharge it is necessary to identify whether or not consumer surplus is present and to measure its value. To this end chapters three and four discuss and develop a method to measure this consumer surplus and quantify how much the public is willing to pay for a Bay Management Plan. Before commencing this process, Local Coastal Fora (LCF) as a coastal management financing option are discussed in terms of their applicability to Plettenberg Bay. The effectiveness of local coastal co-management is then analysed in response to the second question posed in this study.

2.2.4 A Role For Local Coastal Fora (LCF) In Coastal Management Financing

McGlashan (2003) notes that voluntary or partnership coastal management approaches have developed in many countries with varying success. In the United Kingdom for example, organisations known as Local Coastal Fora (LCF) have evolved in an attempt to manage Britain's coastal zones and estuaries. LFC are made up of a spectrum of stakeholders, which pay a subscription fee to the LCF for membership. There tends to be a series of membership levels ranging from local authorities (with some degree of statutory responsibility for the management of coastal resources), to companies, research organisations and indeed individuals. These LCF do not, however, have the statutory power to legislate a management project from the planning phase to the implementation phase. The key concept driving such organisations is to encourage their members to facilitate LFC policies through the powers that they do have (essentially leading a community by example) (McGlashan, 2003).

Experience has shown that LCF tend to be financed through four main mechanisms (McGlashan, 2003:394):

1. 'Pump priming' from an independent agency (the World Bank or United Nations for example)
2. Application to the European Commission for funding of individual coastal projects
3. Membership subscriptions (for the provision of services ranging from newsletters to conferences)
4. 'In kind' contributions (in the form of the provision of aspects such as office space and donations of time and labour)

A number of concerns arise from these funding mechanisms. First, many LCF have been shown to suffer from 'hamster wheel syndrome' (Firn & McGlashan, 2001). This refers to the fact that project staff spend more time trying to raise funds than they do on their primary objective: developing coastal management strategies. Second, applications for financing are very seldom based on any economic rationale or need, as a result successful fund raising is based solely on the persuasiveness of the fund raiser's argument. The effects of this are highlighted by the Scottish LCF experience: a recent LCF assessment saw only one of the nine Scottish LCF considering themselves nearing financial stability, with none having secured medium term funding (3-5 years) (Firn & McGlashan, 2001).

Another concern, particularly relevant in the context of a Bay Management Plan for Plettenberg Bay, comes from the distinction between core funding and project funding. Core funding refers to the funds used for administration type expenses such as office rental, staff salaries and telephone costs. Project funding refers to the funds needed for particular exercises such as beach clean-ups and awareness campaigns (McGlashan, 2003). Project funding is obviously easier to raise as there is a certain amount of publicity associated with sponsoring such activities, (which also addresses Corporate Social Investment (CSI) directives that large companies in particular have to consider). Sustainable core funding however is more difficult to attract as it is less appealing to sponsors in terms of the publicity and public relations benefits associated with the more 'mundane' activities funded with core funds.

LCF experience leads to the conclusion that such projects are unlikely to be financially viable in the long run. It does however highlight the importance of 'bottom-up' inclusion of stakeholders from the community for effective, pro-active coastal management. In light of

this a non-governmental Bay Management Forum could be introduced to aid in the management of the Bay. This Forum is a necessary but not sufficient condition for effective coastal management, there is also a need for continued strengthening of local statutory responsibility for and authority to manage coastal assets. The White Paper for Sustainable Coastal Development (RSA, 2000) has been the Government's initial response to this need, and is the first step in devolving the political, fiscal and administrative authority to manage coastal assets in a sustainable way. This process sets the framework from which coastal management institutions can evolve. The next step in the case of a Bay Management Plan in Plettenberg Bay is the establishment of a representative Bay Management Forum; drawing on members of the business community, research organisations and representatives from interest groups such as the commercial fishing and tourism industries. This will ensure that channels of dialogue are set up between governmental and non-governmental role-players to coordinate coastal management initiatives (Glavovic, 2000).

2.3 CO-MANAGEMENT AS A COASTAL MANAGEMENT STRATEGY

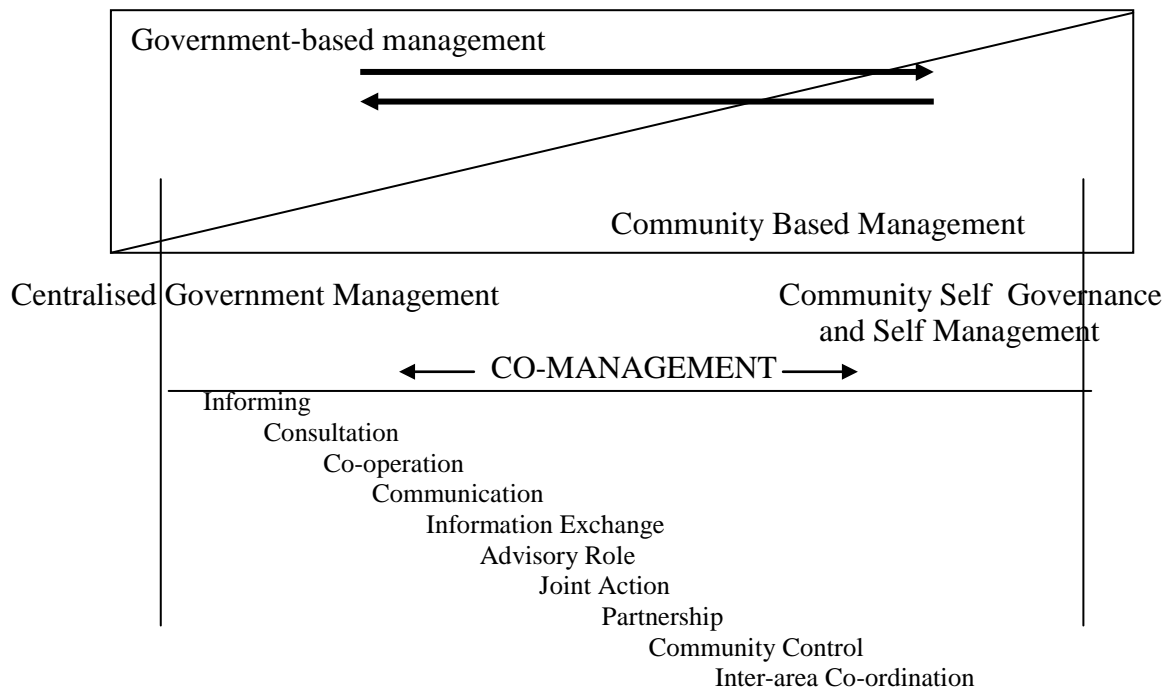
The White Paper highlights what has been experienced internationally in emphasising that coastal resource management cannot be done efficiently without buy-in from those who utilise the resources as well as their support in ensuring that legislation and regulation works (Pomeroy & Berkes, 1997). A co-management strategy has developed in response to this need for user inclusion and a rich pool of literature has followed this management trend. Co-management is generally accepted to describe management frameworks based on the collaborative and participatory process of regulatory decision making among representatives of user groups, government agencies and research institutions (Jentof, 1989).

Co-management signifies a shift away from heavy authoritarian government control of resources in a direction seeing resource users becoming more involved in resource management. Justification for this paradigm shift from two fundamental motivating factors: firstly resource users are those who interact with the resource most intimately, they therefore have experiential knowledge that can be combined with knowledge gained from social and biological sciences to produce more effective solutions to management issues. Secondly, the more users are involved in regulatory decision making the greater the probability that regulations will be deemed legitimate and thus users will be more likely to comply with such regulations (Jentof, McCay & Wilson, 1998).

There are a number of non-governmental organisations in Plettenberg Bay that have a great deal of local knowledge and experience. These organisations should provide the basis for the Bay Management Forum discussed above. The Plettenberg Bay Tourism Bureau has an understanding of the trends in and nature of the tourism market in Plettenberg Bay. It is vital to have this knowledge and experience at hand to develop a Management Plan for local economy heavily dependent on tourism. There is also an active coastal research community in Plettenberg Bay: the ORCA Foundation (Ocean Research Conservation Africa) is a research and education foundation that currently runs educational courses for schools in the area. The purpose of these courses is to improve public awareness regarding coastal management particularly amongst the younger generation. The ORCA Foundation as well as the Centre for Dolphin Studies are currently involved in several projects that will provide scientific guidance for future biological regulation of the Bay and its inhabitants. The inclusion of these role-players in developing a practical Management Plan is therefore vital to ensure the effectiveness of management regulations. The Hake Hand Line and Ski-Boat Associations represent other stakeholders in the Plettenberg Bay community that must be included in the Bay Management process. The experience that the members of these associations have regarding the local coastline will be invaluable for the development of local coastal management regulations. Importantly, the inclusion of these members of the community in the development of such regulations will mean that regulation compliance will be far more noticeable.

Co-management frameworks have been instituted in a number of countries to suit a wide range of conditions and situations (Nobel, 2000; Ballinger, 1999). What has been shown through the analysis of such case studies is that there is no 'one size fits all' co-management model. Hauck & Sowman (2001) note that this is due to the fact that co-management models world-wide are modified to handle different mixtures of historical circumstances, needs and demands that occur within different countries. The result of these varying contextual mixtures is a spectrum of management structures varying from users merely being consulted with regard to regulation formation to users becoming actively involved in the design, implementation and enforcement of regulations (Pomeroy & Berkes, 1997). Figure 2d below illustrates the co-management continuum:

Figure 2c: The Co-management Continuum



Source: Pomeroy & Berkes (1997).

The above diagram shows that at the two extremes resource management can either be through centralised government control or through community self-governance and self management (Pomeroy & Berkes, 1997). Both extremes are rare in reality and it is more likely that a management framework will to some extent involve both parties. Each party's involvement is determined by factors such as the degree to which there is political support for user involvement as well as the capacity and skills of the potential partners in the management of the resource (Hauck & Sowman (2001). In the context of Plettenberg Bay local government has shown dedication to the process of co-management in supporting an initial framework for a Bay Management Plan. The inclusion of the non-governmental organisations discussed above will provide a solid skill, knowledge and experience base from which to proceed with a Bay Management Plan. This suggests that extensive community involvement would work well in the context of Plettenberg Bay, as there is the required capacity for such involvement within the local community.

2.3.1 Institutional Roles In Coastal Co-Management

Sustainable and efficient use of coastal resources is highly dependent on rules and regulations which are set in place to ensure that individual human behaviour coincides with the collective interest of the community of resource users. In light of this the institutional role can be seen as playing custodian to the rules that constrain and guide individual behaviour to be in line with collective interests (Jentof *et al*, 1998). Historically resource management has been conducted by relatively centralised government institutions, with perhaps some user consultation. Co-management is now seeing a shift along the management continuum as illustrated in diagram 2d. The underlying co-management tenet is not so much the actual change in regulations but the communicative and collaborative way in which the new regulations are arrived at (Jentof *et al*, 1998). Thus institutions in the context of co-management can be seen as:

“consisting of cognitive, normative and regulative structures and activities that provide sustainability and meaning to social behaviour. Institutions are transported by various carriers- cultures, structures and routines – and they operate at multiple levels of jurisdiction” Scott (1995:33).

In keeping with this definition Schalger & Ostrom (1992) make a distinction between operational and collective rules that can be seen as the tools of the institution: Operational rules refer to what are commonly seen as the actual rules in place to govern individual behaviour. Collective rules, however, refer to who may participate in rule creation and to what extent.

2.3.2 Is Co-Management A Step In The Right Direction?

A discussion of co-management would paint a misleadingly bright and indeed incomplete picture of the framework if it did not include an understanding of the limitations of the concept. Although the volume of literature supporting co-management overshadows alternative strategies, there are indeed concerns with the strategy:

Nichols, (1999) argues that co-management perversely influences the political structure of coastal management programs in that it centralises the objective of reorganising coastal societies for the overriding purpose of stimulating economic growth. This she (Nichols, 1999) purports, leaves co-management as a regulatory instrument that creates favourable conditions for non-local capital to penetrate localised communities. By opening coastal political, social and economic systems to forces of external capital the management strategy essentially marginalizes the communities for whom the management strategy is supposed to work.

This phenomenon can be illustrated by means of a case study from Sri Lanka showing how the mechanism unfolds (Nichols, 1999): the ‘liberalisation’ of coastal economies through integrated coastal management regulations may stimulate ‘low impact’ industries such as eco-tourism and bio-prospecting to such an extent that ecosystem damage begins to occur. This would undoubtedly lead to withdrawal of capital from that area of coast that in turn may lead to a reversion to the historic leviathan approach to resource management.

Hotel dis-investment has occurred in Sri Lanka as a result of reef degradation (due in part to recreational diving pressure leading resource managers to support the eco-tourism industry by providing the industry with more elite access to the coral reefs by creating reef sanctuaries. The severe exclusion of more traditional resource users, such as coral miners and fishermen, has resulted in illegal use of sanctuary resources, not out of choice but out of necessity (Nichols, 1999).

The above phenomenon has particular significance for the future management of Plettenberg Bay. If coastal management authorities were to give increasingly exclusive access to tourism related activities, other coastal resource users would be increasingly excluded. This will lead to a situation where the ‘integrated’ co-management approach results in the polarisation of resource user groups into politically favoured and disfavoured factions. In turn this may bring with it a forced zonation of the coastal environment which would require time consuming and costly policing by the governing body (Kenchington & Crawford, 1993). They (Kenchington & Crawford, 1993) note that the changes needed to implement an integrated co-management framework will almost always require that pre-existing resource use rights be ‘limited’ to conform to superimposed regulations. Nichols (1999) highlights that this may or may not have been arrived at in full consultation with local users but which will undoubtedly contain an underlying objective of promoting economic efficiency in extracting and consuming resources.

The creation of a Marine Protected Area in Plettenberg Bay for example will strip local fishermen of their right to fish in the area. For so long as these marginalized users are not compensated for the losses they incur as a result of the change in regulations, or convinced of the benefits that such regulations bring, the enforcement of such regulations will remain costly or ineffective and possibly both (Kenchington & Crawford, 1993).

Another important concern arises from the international experience in the interpretation of the concepts 'full public participation' and the acknowledgement of 'local ethno-knowledge' (Kenchington & Crawford, 1993). As shown above, by the very nature of integrated co-management existing user rights are often 'limited' by the introduction of this strategy. To control the local disquiet caused by such limitations, strategies involving 'education and awareness' are often employed in which resource managers attempt to convert the local coastal population through youth education modules and adult workshops (Nichols, 1999). Concern arises in situations where the drive to 'educate' coastal communities becomes more an exercise in coercion than education.

The news, however, is not all bad: what follows is a discussion of the experience of co-management in South Africa in the context of how the management strategy has attempted to deal with the concerns highlighted above.

2.3.3 Coastal Co-Management In South Africa

The current shift towards coastal co-management in South Africa has arisen in response to the exploitation of coastal resources in addition to an increase in tension between management authorities, resource users and local communities. This is in line with the typical international experience with regard to the introduction of co-management initiatives world-wide (Humphrey, Burnbridge & Blatch, 1999);(Hauck & Sowman, 2001). Limited government capacity to implement and administer management strategies along our extensive coastline (some 3000 kilometres) has also facilitated the shift towards including users in the management process. This is gaining further support as resource managers begin to acknowledge the value that user participation has to offer (Hauck & Sowman, 2001).

2.3.3.1 Performance of Coastal Management Initiatives in South Africa to Date

When discussing coastal co-management in South Africa it is important to realise that it is still in its infancy. Hauck & Sowman (2001) provide an overview of case studies in coastal and fisheries co-management initiatives in South Africa and note that with the exception of relatively few industry-government partnership arrangements co-management projects have been in existence for less than five years. Pomeroy & Berkes (1997). and Olsen (2003) suggest that a time period of between three and ten years is required to effectively organise communities and evaluate the effectiveness of co-management initiatives. Another important consideration is that the majority of co-management initiatives in South Africa have been

initiated by 'external agents' such as NGO's and independent research organisations as opposed to the impetus coming from within the community of resources users. Linked with this consideration is that most of the case studies examined by Hauck & Sowman (2001) rely to a large extent on external financing from either the government or more commonly NGO's. Although this funding is often critical for the initial development of co-management initiatives, a directive emphasised by the White Paper (RSA, 2000: 104), there are a number of concerns with reliance on external funding. These include concerns regarding the underlying donor objectives and unrealistic timeframes for project completion. Importantly, initiatives may well become dependant on uncertain resources to continue running the project Hauck & Sowman (2001).

The above contextual concerns regarding co-management in South Africa have been magnified by the fact that there has been considerable government restructuring since 1994. This restructuring process has led to difficulties in converting policy recommendations into implemented action. These conversion problems have manifested themselves in a perceived lack of government support and buy-in to co-management projects throughout South Africa Hauck & Sowman (2001).

2.3.4 Fundamental Conditions Required For Coastal Co-Management

Having taken these contextual factors into consideration, Hauck & Sowman (2001) draw on the case studies reviewed to provide lessons that have been learnt in South Africa which evolve into guidelines for creating the conditions required for the successful implementation of government–community management partnerships.

Firstly, some degree of assurance of access rights to the community of users must be negotiated between the governing body and the users. No particular property right arrangement need be used, but as Hauck & Sowman (2001:178) explain, a sense of ownership arises when users have 'priority access' to the resources around them. The rationale behind securing access rights is that once these rights are in place, the users have considerably more individual and collective incentive to manage the resource in a sustainable way (Jentof, 2000). A Bay Management Forum would provide the channel through which the local community can air its concerns and recommendations regarding the management of Plettenberg Bay. A sense of ownership results when these community concerns and recommendations are

converted from being mere suggestions into actual regulations regarding the management of the Bay.

A second necessary condition for effective co-management is long term government dedication to co-management initiatives. Hauck & Sowman, (2001) highlight that in many of the case studies reviewed this dedication was conspicuous by its absence. This has been one of the more concerning constraints to coastal co-management in South Africa which has been put down to lack of capacity within government departments to support co-management initiatives, which has been compounded by the confusion caused by radical government restructuring in recent years (Hauck & Sowman, 2001). However, the completion of the White Paper (RSA, 2000) saw the culmination of an extensive process of public participation, research and analysis by the Coastal Management Policy Program (CMPP). Considerable effort went into this process that ran from May 1997 to April 1999 that saw over 5000 individuals and organisations directly involved in the policy formation process (Glavovic, 2000). This is indeed a signal of the government's long-term dedication to the task of coastal resource management, and puts to rest the concerns raised by Kenchington & Crawford (1993) regarding 'full public participation' and the acknowledgement of 'local ethno-knowledge'. Interestingly, a dynamic identified by Hauck & Sowman (2001) in their case study analysis is the fact that as long as there is a high level of compliance, government officials tend to support co-management efforts. However, low levels of compliance and incidences of illegal activities lead the government to adopt the more heavy handed management approach, used in the past. The development of a functioning model of coastal co-management in Plettenberg Bay would further strengthen local and national support for co-management initiatives in other areas along the coast.

A holistic and integrated approach to resource management is a third condition required for the effective implementation of coastal co-management. This means that the Bay Management Forum must view the management of the Bay through as wide a spectrum of economic and social development opportunities as possible. In doing so the Forum will be better equipped to deal with situations where over-exploitation of resources is occurring by providing guidance towards other economic activities that provide tangible economic benefits (Hauck & Sowman, 2001).

Finally, and most notably in the context of this study, Hauck & Sowman (2001) observe that sufficient time and resources need to be allocated to initiatives to ensure that their individual goals are achieved. To date the majority of co-management projects in South Africa have been funded by external agencies. This immediately gives rise to the concerns about the underlying objectives of such funding agencies and the extent to which this funding can be relied on in the long run. The current trend towards fiscal decentralisation and the introduction of an environmental surcharge alluded to in this chapter may provide the stable source of funding that is vital to the success of co-management projects.

2.4 CONCLUSION

In response to the first of the three questions posed in this thesis, section 2.1 of this chapter has shown that current institutional structures for coastal management in South Africa do support the introduction of a localised environmental surcharge in Plettenberg Bay. The White Paper's (RSA, 2000) drive for the devolution of coastal management functions, to the lowest tier of government able to carry out these functions, provides the channel through which the required fiscal decentralisation can proceed. From a theoretical perspective it has been shown that the introduction of such a surcharge may result in tourists (and potentially residents) 'voting with their feet' in choosing to frequent other coastal areas that have not introduced such a surcharge. The fact that the recreational experience Plettenberg Bay has to offer may well have been undervalued in the past suggests that there may well be consumer surplus associated with consuming the experience. To the extent that this consumer surplus is present, the introduction of an environmental surcharge will not lead to a reduced demand for recreational trips to Plettenberg Bay provided the surcharge does not exceed consumer surplus. In addition to this the provision of a local Bay Management Plan as a public service has not been included in the mix of public services offered by the municipality before. In light of this and the fact that there may well be a strong preference for such a service the introduction of an environmental surcharge has the potential to more efficiently satisfy the public environmental service preferences of those that live in and visit the area.

In response to the second question posed in this thesis, section 2.2 has shown that there is indeed a case for local coastal co-management in Plettenberg Bay provided the four conditions discussed above are met: The community needs to develop a sense of ownership through the co-management process and the Government's dedication to the co-management process must be clearly communicated to everyone involved in the process. In addition to

this the Bay Management Forum must foster as wide a schedule of sustainable resource use activities as possible to ensure that the Management Plan is able to adapt to the dynamic nature of the coastal system in the future. As Hauck *et al* (2001) emphasize, the identification of a project ‘champion’ from either the community, local conservation agency, external NGO or research organisation is a vital to the development of co-management initiatives. These are the individuals who motivate the partners involved in the project through encouragement and support during the ‘ups and downs’ that invariably occur during the planning and implementation of co-management partnerships (Hauck *et al*, 2001: 182). These champions also ensure that the local community is kept up to date with regard to any changes that the co-management initiative will bring. Of particular importance to the proposed Plettenberg Bay Marine Park, such individuals must be tasked with ensuring that the link between the costs of providing the service and the perceived benefits is kept strong. This may come in the form of regular updates as to the status of the quality of the Bay over time. In addition to this the Bay could be marketed as the first community financed Marine Park in South Africa, a marketing strategy that would benefit the entire community through increased tourism activity in the area and in doing so strengthen the link between the costs that the community bears in the provision of the Marine Park and the benefits that they receive from the presence of the Marine Park. As such the project champion can be seen as the glue holding the co-management partnership together as well as the fuel that drives the management process.

Finally, and most notably in the context of this thesis, a source of stable, long-term financing for the Management Plan must be secured to ensure continuity in the management of the Bay; the introduction of an environmental surcharge would effectively provide the financing source required. However, the question of how to set this environmental surcharge remains and chapter three begins the process of answering this question with a review of techniques used to analyse the value of natural resources such as Plettenberg Bay. The need for an accurate value to be placed on the Bay is due to the fact that the Bay’s value will provide a logical base from which to set an environmental surcharge.

CHAPTER 3: NON-MARKET RESOURCE VALUATION THEORY

3.1 INTRODUCTION

Managers in all spheres of environmental management are faced with complicated budget allocation decisions, decisions that are made particularly difficult in situations where the resources they are charged with managing are not readily traded, and thus not priced in a market (Loomis, Kent, Strange, Fausch & Covich, 2000). Greeden Mathews, Kask, Rotegard & Stewart (2001) note that scenic beauty, species preservation and ecosystem services are just such environmental goods and while the cost of maintaining such resources can be calculated relatively easily in monetary terms, the benefits these resources provide remain far more elusive. The end result is that it becomes difficult to weigh up such costs and benefits in order to make efficient budget allocations and effective policy decisions. These non-market resources are not traded in markets and thus do not yield readily observable prices and demand curves, however this does not mean that the public does not have preferences for these goods (Greeden Mathews *et al*, 2001). In light of this, numerous non-market valuation techniques have been developed to analyze and quantify such preferences.

In what follows the concept of the total economic value of an environmental resource is explored. This is followed by a discussion of the concepts that are employed in the valuation of environmental resources. A review of commonly used valuation techniques is then presented, outlining the methodologies employed by each technique followed by the theoretical difficulties that each technique encounters. This provides the theoretical base from which the underlying valuation methodology used in this study will stem.

3.2 DEFINING THE TERM “ECONOMIC VALUE”

Brown (1987) in Pollock, Jones & Brown (1994) criticises resource management authorities for the frequent (and often misleading) use of expenditure data as an economic value to bid for larger program budgets. Expenditure does not provide a direct estimate of the types of values that resource management authorities are attempting to typify. Pollock *et al* (1994) site an example: fisheries authorities may claim “anglers spent one million rand in our province this year. For this reason angling has a significant economic impact in our province and thus we require more money to develop quality fishing programs.” The authorities may be

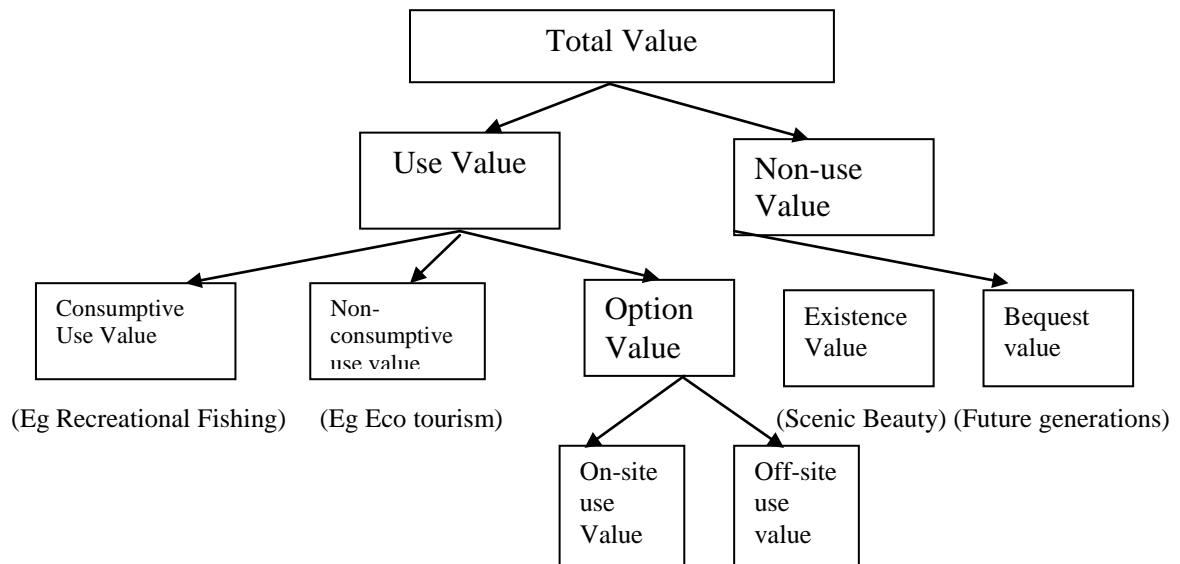
successful in their request, but the additional funding received has not been determined by any direct measure of either need or benefit - the grant has been determined solely by the persuasiveness of the authority's argument and has little objective merit.

What Pollock *et al* (1994) emphasise is that legislators (fund authorisers) require more direct information pertaining to for example, how much each rand spent on fisheries programs will generate public benefits and how these benefits will be distributed among the different population groups in the area. To address these issues authorities need to determine the values that individuals place on activities involved in using the resource and integrate these values into quantitative decision-making models (Pollock *et al*, 1994). Putting an economic value on natural resources is thus crucial to the efficient (and sustainable) management of such resources. Ozuna & Stoll (1991) emphasise that estimating the values of natural resources is important because these values are used in cost-benefit analyses in projects that directly affect the continued well being of such natural resources.

3.2.1 Resources As Public Goods

Natural resource "goods" share the characteristics of public goods in that they are non-excludable and non-rival goods. Put differently these characteristics describe goods that provide benefits that no one can be excluded from enjoying. These characteristics make it extremely difficult to price the use of a natural resource "good" as resources are not bought and sold in the market place and, as a result, have no direct price (Lee, 1993; Loomis *et al*, 2000). Indeed many environmentally sensitive people describe them as being priceless. This is central to problems associated with pricing environmental amenities and goods. Ozuna & Stoll (1991) analyse the concept of value further in noting that the total value an individual places on a natural resource can be split into categories of use value and non-use value. This can further be broken down into consumptive and non-consumptive use value; Figure 3a below outlines the concept of value in the context of Plettenberg Bay.

Figure 3a: Components of total economic value

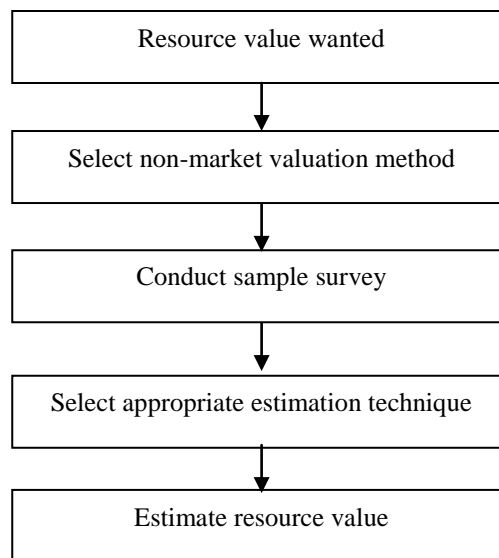


Source: Adapted from Ozuna & Stoll (1991)

Use value can be further broken down into consumptive and non-consumptive use value examples of which are recreational fishing and eco tourism activities respectively. People also value the idea of being able to continue their use activities in the future both on-site and off-site (option value). They (Ozuna & Stoll, 1991) describe off-site value to include any activities carried out away from the resource, such as reading about a particular place, or watching films about the natural environment. Anticipated (option) on-site and off-site value refers to the holding of some expectation of seeing or using a natural resource in the future and, knowing that a natural resource exists, is arguably enough to create existence values (Ozuna & Stoll, 1991; Loomis *et al*, 2000). The above categorisation of natural resource value further complicates the process of valuation in that it accentuates the problematic public good characteristics associated with natural resources.

To this end a significant amount of research has gone into the development of ways to estimate values associated with natural resources and incorporate these values into meaningful economic studies: Ozuna & Stoll (1991) site a simplified schema for obtaining a non-market resource value (figure 3b):

Figure 3b: Schema for obtaining a non-market resource value



Source: Ozuna & Stoll (1991)

The above figure shows how non-market resource values can be estimated: Firstly one must decide on what resource value is desired, then it is necessary to select a non-market valuation method that is capable of estimating the desired value. A survey is then needed to collect the necessary data and the most appropriate estimation technique must then be selected, from which an estimate of the non-market resource value is determined (Ozuna & Stoll, 1991). The refinement of non-market resource valuation literature has led to close attention being paid to the above aspects. In addition, Bowker & Stoll (1988) point out that it is also necessary to think carefully about the type of extrapolation that can be made from sample data to acceptably estimate population values.

The above outline for obtaining a non-market resource value is highly simplified but provides a clear understanding of the process of estimating such value. In reality, however, this is a complex process and to effectively apply valuation methods it is necessary to have an understanding of the economic theory underlying the measurement of value and insight into the overall framework in which valuation studies are carried out (Stoll *et al*, 1987 in Ozuna & Stoll, 1991).

3.3 ECONOMIC STUDY FRAMEWORK

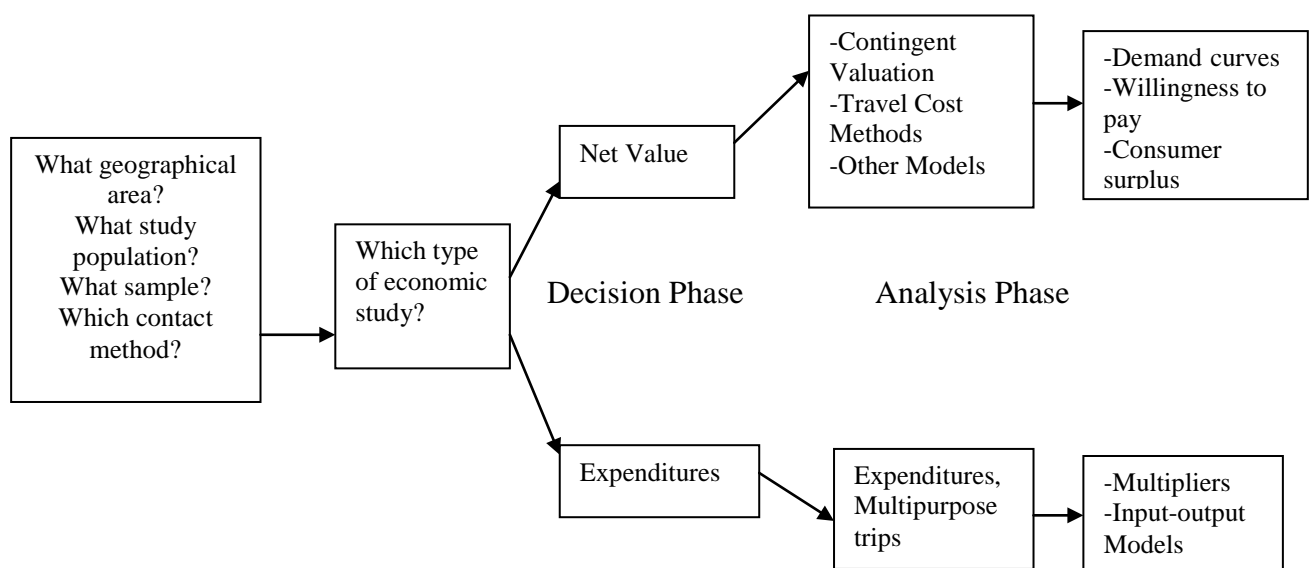
Pollock *et al* (1994) outline a framework for carrying out economic studies related to the valuation of natural resources. In the case of managing bay resources this framework can be employed and, if applied correctly, has the potential to provide accurate and meaningful information pertaining to the value of the resource and its management:

The first task at hand is defining the study, which involves determining and specifying goals and objectives. These decisions lead to the determination of the geographic area of study, the study population, the survey methods and at the end of the day the type of analysis to be applied to the data collected (Pollock *et al*, 1994).

Johnson & Nielson (1983) in Hunt & Ditton (1996) emphasise that defining clear objectives is vital because without clarity the study will lack focus. Developing objectives is difficult because, more often than not, numerous individuals (with sometimes differing agendas) are involved in the process. For this reason, all those involved should focus as objectively as possible on what analysts need to know about the users of the resource in the region (Hunt & Ditton, 1996).

Pollock *et al* (1994) then identify a process to assist in choosing the correct natural resource value to use in the study. This process is summarised in figure 3c below:

Figure 3c: Procedural framework for conducting environmental economics studies.



Source: Pollock *et al* (1994)

Most resource economics studies are carried out to determine either the economic impact of the resources in question or their net value, in both cases it is necessary to delimit the study,

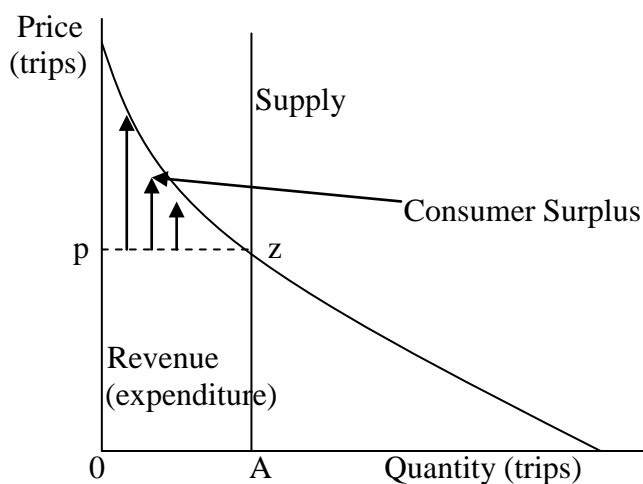
choose the relevant methodology, design the survey instrument and finally collect the data needed for the analysis Pollock *et al* (1994).

Economic impact as defined by Pollock *et al* (1994:257) is “the extent to which a business, community, region or entity is changed (for example in quantities of sales, jobs or income) by some event such as an improvement or degradation of a fishery”. They (Pollock *et al*, 1994:257) define net value to be “the amount of benefit received by an individual or group from a product or experience over and above the cost of obtaining it”. Figure 3c highlights the difference between an economic impact study and studies involving the net value of an environmental resource. When one wishes to examine the direct economic impact of a natural resource on the local community, the correct measure is total expenditure. When one wishes to examine the value of a resource to a particular population group the appropriate economic measure is the net value over and above expenditures (Pollock *et al*, 1994).

3.3.1 Net Valuation Survey Methods

The concept of net valuation in the context of Plettenberg Bay’s marine resources is illustrated diagrammatically in figure 3d where the y-axis represents the price (cost) of each recreational trip and the x-axis represents the quantity of trips demanded.

Figure 3d: Demand - supply framework illustrating consumer surplus



Source: Pollock *et al* (1994:266)

where:

P = Supply fixed, constant price

Z = Market in equilibrium (shows level of consumption at going price)

Rectangle OPZA = expenditures made by resource users at price P per trip.

The area above supply curve and below demand curve represents benefits received by users over and above the price actually paid or consumer surplus (Greedon Mathews *et al*;2001). The price per trip is assumed to be constant because, although the price may vary with time, every resource user on a particular day will have to pay the same prevailing price. This represents the supply curve for trips. The demand curve is a standard downward sloping demand curve representing the total amount that resource users are willing to pay for different numbers (quantities) of trips. The rectangle OPZA represents total expenditures made by users for trips taken at the prevailing price P per trip. The area above the supply curve and below the demand curve represents benefits received by users over and above the price actually paid (consumer surplus). From this it can be inferred that users would be willing to spend an amount, equal to their consumer surplus, more than they actually have to spend on trips. When aggregated to represent the population in question, this can be seen as the net value of the resource or the users' willingness to pay for the resource (Pollock *et al*, 1994).

This consumer surplus or willingness to pay does not involve the exchange of money as such and cannot therefore be directly observed in monetary terms. As a result economists have devised several methods to estimate consumer surplus related to the utilisation of natural resources (Pollock *et al* 1994):

3.4 NON MARKET RESOURCE VALUATION METHODS

The following section outlines the measurement of willingness to pay for a specified change in some environmental resource, which is the overall objective of natural resource valuation methods. The approaches used by each method to accomplish this objective are then reviewed and evaluated in terms of their ability to deliver meaningful estimates.

3.4.1 Willingness To Pay (Contingent Valuation)

Burns (1999) outlines a choice framework from which welfare measures can be interpreted and illustrated for an individual. This choice framework is shown in Figures 3e and 3f.

Figure 3e: Levels of utility and choice

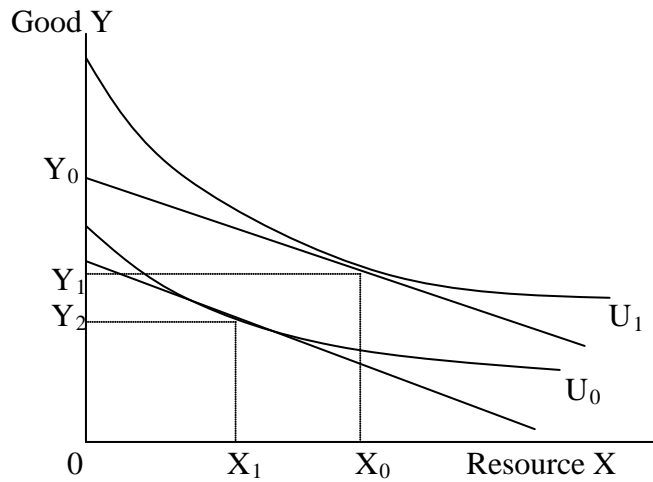
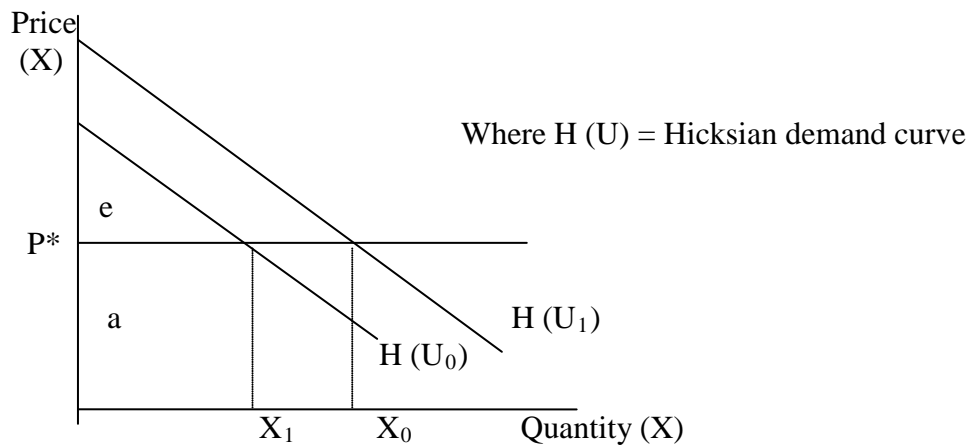


Figure 3f: Demand schedules illustrating willingness to pay



Source: Burns (1999)

Standard indifference curves are used and demand curves similar to the one in figure 3d are employed in this framework. The situation shown here is where an individual can allocate their full income to the consumption of goods and services other than the environmental resource X, and achieve utility level U_0 . Alternatively, they can allocate some of their income to consuming X that is available at a price p^* . As a result, by consuming the bundle (Y_1, X_0) the individual can achieve a utility level of U_1 (Burns, 1999).

When defining willingness to pay (WTP) as a total measure, including amounts paid for consumption, it is necessary to first consider the measures that apply when the individual is allowed to vary the quantity of X. For example, this could be when individuals choose how long to remain in at a recreational site (Burns, 1999). Here the WTP expression is defined in

terms of WTP to purchase X at a price of p^* rather than have zero X. The magnitude of the WTP reflects both amounts paid and consumer surplus and is given by $(Y_0 - Y_2)$ in figure 3e and by $(a + e)$ in figure 3f (Burns, 1999).

3.4.2 Issues Involved In The Practical Explanation Of WTP

The above discussion explains WTP from a theoretical point of view, however it is necessary to ‘translate’ this definition of WTP into layman’s terms when it comes to conducting a CV survey amongst the general public. Defining an individual’s maximum WTP is particularly difficult to convey, Whittington (1998:22) sites an example highlighting this translation issue: when asked to state their maximum WTP an interviewee responded “What do you mean the maximum I would be willing to pay? You mean if I had a gun to my head?” This is quite obviously not the value a researcher is looking for; instead researchers require the amount individuals are willing to pay in the context of existing institutional regimes under which individuals are free to allocate their personal financial resources (Whittington, 1998).

Another important aspect to the explanation of WTP is the willingness *and ability* to pay for the proposed situation. Table 3a highlights the characteristics required of an individual to be in a situation to put forward a credible WTP estimate.

Table 3a: The distinction between being willing and able to pay for a good

| | | |
|-----------------|-------------------------|--------------------------|
| | Willing to pay | Not willing to pay |
| Able to pay | Willing and able | Not willing but able |
| Not able to pay | Willing but unable | Not willing and not able |

Source Whittington (1998)

The above table highlights the fact that respondents can be classified according to four separate groups; firstly an individual may be willing to pay and able to pay, in which case they accept the scenario and have the financial resources to back their WTP estimate. Secondly an individual may be able but not willing to pay, in such a situation the individual may have the financial resources to pay but chooses not to. Thirdly the individual may be neither willing nor able to pay for the scenario. In this case the individual cannot afford to pay for the good in question and even if their income were increased they would not be prepared to accept the scenario. Finally an individual may be willing to pay for the good in question but unable to do so. Such cases cause some confusion to non-economists as it is argued that these people would *like* to pay but cannot. It is important to enforce the budget

constraint in such situations and reject the estimates put forward by such individuals (Whittington, 1998).

3.5 THE CONTINGENT VALUATION METHOD (CVM)

The CV method was developed to estimate what value particular segments of the public put on changes in the quality of natural resources. It provides a means of assigning monetary values to resources and service flows that are not priced or under-priced by the market. CVM is based on neo-classical welfare economics, where the value of an environmental resource to an individual is expressed either as their maximum willingness-to-pay (WTP) to acquire or safeguard it (Pollock *et al* 1994). More specifically a CVM study can be seen as a survey based approach to valuing non-market goods which extracts information regarding the value an individual places on a good through the use of a specifically designed survey instrument. The value placed by the individual on the good is said to be contingent on the good described during the survey (Loomis *et al*, 2000).

CV methodology has its roots in the work done by Ciriacy-Wantrup (1947), who proposed that people should be asked how much they would be willing to pay for additional amounts of a specific good. In doing so this tracking of consumer behaviour models the demand schedule for that good, a schedule that would otherwise be hidden in the absence of market related data (Hanneman, 1994). In the proceeding years the technique has been extended and improved on to such an extent that it has been applied to the valuation of a wide variety of non-market goods ranging from the recreational value of wildlife viewing (Navrud & Mungatana (1994), Shultz, Pinazzo & Cifuentes (1998) to quantifying the value placed on public goods in the health sector (Swallow & Woudyalew, 1994). Perhaps the most famous CV study to date was the study completed by Carson *et al* (1992) which came about as a result of the Exxon Valdez oil spill in March 1989. The study was used in court proceedings in an attempt to quantify the value people place on environmental goods that such individuals will never use (passive use values).

The Exxon Valdez disaster sparked a heated debate as to whether CV methodology accurately portrayed the value people put on non-market resources, so much so that the National Oceanic and Atmospheric Administration (NOAA) appointed a panel of social scientists to evaluate the consistency and validity of CV outputs. The report was the end result of the panel's

deliberations and provides CV researchers with a review of the drawbacks of the CVM, key survey instrument design issues and guidelines that researchers should take cognisance of to produce reliable information (Arrow, Solow, Portney, Leamer, Radner & Shumar, 1993).

A discussion of the issues brought to light in this report along with other CV issues follows:

3.5.1 Concerns With The CVM

Smith (1993) cautions economists in saying that reliability and accuracy issues (for all methods of non-market valuation including the CVM) cannot be completely answered without carrying out controlled experiments. Unfortunately, by adopting any degree of control, the types of natural resources and decisions that can be included in the CVM become limited. As a result of this there will always be scope to question whether experimental findings are relevant to the situations that cannot be considered. The debate concerning the reliability of CVM studies has focused on the following fundamentals of CV methodology:

3.5.1.1 Departure From Rational Choice Theory

Economic rationality essentially requires that there is a level of consistency with regard to the choices people make. For example if an individual were to purchase an amount of a good at a certain price and income level, it follows that if the price of the good falls with all else remaining constant, the individual would be better off purchasing the same quantity of the good at the revised price (Arrow *et al*,1993). In addition to this, rationality often requires that people prefer more of a good to less of a good provided the person does not reach the level of satiation. In the context of WTP studies this is interpreted as an increase in a person's WTP as the extent of the good being valued increase (Arrow *et al*, 1993). Departure from this fundamental economic idea in CV studies is known as the embedding effect, the symptoms of which are a lack of sensitivity to the scope of the good being valued. Critics of the CVM note that as a result of this embedding effect, an individual's response to CV questions is in fact not a true measure of their economic preferences (Diamond & Hausman, 1994:46).

Perfect embedding occurs when the same WTP is found for an inclusive good and for nested commodities (subsets) within that good (Hoevenagel, 1996; Carson & Mitchell, 1994). There has been significant empirical work done to explore the embedding effect (Smith & Osborne, 1996), according to Carson & Mitchell (1993) the most plausible demonstration that responses to CV surveys are not sensitive to the scope of the good is a study undertaken by Desvousges, Johnson, Dunford, Boyle, Hudson & Wilson (1992). The experiment involved eliciting the

value that the Atlanta public placed on preventing the deaths of 2000, 20 000 and 200 000 water fowl from oil ponds in the Rocky Mountain flyway. The results suggested that the average willingness to pay to save 2000 birds was not significantly different from saving 20 000 or 200 000 birds. Initially this suggested that the respondents were not showing any sensitivity to the scope of the 'good' they were asked to value as the experiment showed that diminishing marginal willingness to pay was almost non-existent. *A priori* expectations suggest that marginal willingness to pay should decrease, as more of a good is better but utility from consuming more of the good decreases as more of the good is consumed.

The outcome of this survey is consistent with an alternative hypothesis for the explanation of responses to CV questions: the 'warm glow' effect. Critics claim that individuals may experience a 'warm glow' by expressing support for good (environmental) causes (Diamond & Hausman: 46) and in doing so 'purchase moral satisfaction' as opposed to a given quantity of the public good being valued (Carson & Mitchell, 1993).

However, as Carson & Mitchell (1993) note, there is some uncertainty as to whether the differences in stated value of the 'good' are in fact a true reflection of their differences in value: This concern arises as a result of the fact that the respondents asked to value the 2000 bird scenario were told that they will be saving *much less* than 1% of the bird population, the respondents to the 20 000 bird scenario were told that they would be saving *less* than 1% and the respondents to the 200 000 bird scenario were told that they would be saving *about* 2% of the bird population. The lesson learnt from this and other studies (Kahnman & Knetsch, 1992) is that it is of paramount importance to clearly define the good one asks respondents to value, an issue dealt with at a later stage in this review.

Another concern with responses to CV surveys is the occurrence of 'protest zero' WTP bids. The distinction between a true zero bid and a protest zero bid is that a protest zero value recorded by an individual contradicts questions posed elsewhere in the survey that indicate that the individual does indeed value the public good in question (Diamond & Hausman, 1994). In such instances the individual has essentially refused to accept the valuation scenario and thus fails to reveal their true preference for the good (Lee, 1993). A credible CV study must thus include follow-up questions to the main valuation question to probe the rationale behind a respondent's zero bid. This will allow for the distinction between credible zero bids

(which should be included in the analysis) and incredible protest zero bids (which should be excluded) (Horton, Colarullo, Bateman & Peres, 2001).

3.5.1.2 Implausibility of WTP Results

The goal of CV studies is to arrive at an average amount that individuals are willing to pay for specific goods and services. Although some respondents may not value the good at all and respond with a zero willingness to pay, the most common outcome is at least a nominal amount. This leaves the researcher with the problem of what population figure to aggregate this average WTP figure to. If one were to aggregate the figure to national or even global population figures the aggregated amount would be anything but nominal (Arrow *et al*, 1993). The NOAA panel acknowledged this issue but was not convinced; the reason being that it is difficult to have any sort of intuitive guidance as to what constitutes a reasonable total (Arrow *et al*, 1993). Of more concern to the panel was the fact that, assuming WTP estimates were accurate, there may be many environmental goods or programmes available to individuals at any given time and even a very small WTP estimate for each of the programmes would leave the individual severely out of pocket. The panel thus highlighted the need for respondents to be reminded of and seriously consider alternative ‘goods’ that may be substitutes for the ‘good’ proposed in the scenario in question (Arrow *et al*, 1993).

3.5.1.3 Budget Constraint Reminders

The NOAA panel also highlighted the fact that respondents must take cognisance of meaningful budget constraints. Even if respondents were to accept the hypothetical situation presented to them during the survey process, if they do not seriously consider their personal disposable income and other budgetary commitments there is a distinct possibility that they would overstate the amount that they were willing to pay for the scenario in question (Arrow *et al*, 1993). Recent survey instrument design methodology includes a poignant reminder of ones budget constraints, as Horton *et al* (2001: 43) note in their survey instrument “any money you pay in increased taxes you will be unable to spend on other goods or services. You and your household would have to pay this amount each year.”

3.5.1.4 Biases Associated With The CV Method

Although much work has been done to make the decision processes faced by survey respondents imitate those faced in real markets, contingent valuations are still based on hypothetical choices. No respondent has to bear the consequences by paying the price offered, in responding to the survey questions (Lee, 1993). This raises the possibility of a number of

biases to occur. Pollock *et al* (1994) highlight the crux of the situation in saying “Ask a hypothetical question and you will get a hypothetical answer.”

The ‘starting point’ bias occurs when the price mentioned in the survey affects the answers in which a participant may give. This occurs as the consumer is not really aware of the price of the environmental good (Lee, 1993). ‘Strategic bias’, on the other hand, is used to describe the incentive which participants have in providing distorted answers. This is especially so when participants believe that the survey may influence real choice; in this case, participants will have strong incentive to adjust price in a manner that is favourable to them (free riding) (Lee, 1993). ‘Vehicle of payment’ bias refers to how participants adjust their answers according to the way the project is going to be financed. For example, if a project for the preservation of a species were to be financed by local taxes, participants would be tempted to adjust their valuation downwards while if it were financed by the national government, they would tend to state a more correct answer. ‘Hypothetical’ bias points to the fact that if hypothetical questions are asked, then only hypothetical answers could be expected (Lee, 1993; Pollock *et al*, 1994).

3.5.2 Survey Considerations – NOAA Guidelines

First, all the population groups whose values are being measured must be carefully defined. For example, the analyst may only be interested in members of the public who are currently using the resource. On the other hand a broader population group may be of interest. This would be in the case when the analyst required information about users of the resource as well as members of the public who do not use the resource, but derive satisfaction from knowing it exists. The “product” in question must be defined. For example, in the context of fisheries resources the “product” must be broad enough to encompass not only changes in the number and size of fish stocked but also any changes in the overall fishing experience. To this end the subject, condition or change in condition must be made clear to respondents in order for them to give accurate valuations.

CV responses may vary according to the method by which respondents are asked to pay for the given change. Payment methods include licence fees and additional taxes and must be incorporated into questionnaires as realistically as possible. The more realistic the payment method the higher the chance the respondent will be able to give an accurate response in terms of their willingness to pay (Bishop & Heberlein 1990 in Pollock *et al*, 1994).

How the CV questions are asked is another important issue to address: Analysts can adopt a continuous CV strategy in which a bidding approach is used. In such a situation respondents are asked if they would be willing to pay increasingly higher amounts than the value they initially stated until they say “no”. At this stage a maximum willingness to pay is reached. Alternatively the analyst can adopt a dichotomous CV strategy. In such a situation each respondent is asked their willingness to pay a single amount, and the “yes” or “no” answers are recorded as 1 and 0 respectively. The maximum willingness to pay is then calculated from a logit or probit analysis of the probability that a given respondent will pay various amounts (Pollock *et al*, 1994).

Finally additional data may be required to complete the analysis: Income along with other variables will no doubt be required for further analysis or merely to evaluate the validity of the information collected from respondents (Pollock *et al*, 1994).

3.5.3 Evaluation of The Contingent Valuation Method

Research in the context of non-market resource valuation has concentrated on a wide range of indirect gauges of the validity and reliability of CVM findings (Smith ,1993).

Six types of evaluations (or gauges) as outlined by Smith (1993) are as follows:

1. It is possible to compare indirect (such as the travel cost methodology) and CVM estimates of the value of a given change in an environmental resource.
2. Markets can be constructed for commodities that are not usually sold and the resultant values placed on such commodities can be compared with CVM estimates for the same commodities.
3. It is also possible to compare tested and re-tested CVM estimates for the same sample over time.
4. Laboratory experiments can be created in which hypothetical and actual sales of commodities are undertaken.
- 5. Surveys can be conducted where purchase intentions of individuals and actual sales of commodities can be compared.
6. Finally analysts may choose to conduct non-parametric “tests” of the consistency of CVM estimates using the theory of strong axioms of revealed preference.

Armed with the above gauges researchers have come to accept the following aspects of the CVM as being accurate reflection of its performance:

The contingent valuation method is not dependent on indirect links with the market to value a commodity like the travel cost method is, thus it can be used on a wider range of amenities which have use values and non-use values (Lee, 1993).

The CVM may consist of open-ended (continuous) or close-ended (dichotomous) questions. When comparing the travel cost methodology with the CVM, research has shown that the open-ended format has tended to result in underestimation and even negative values of the consumer surplus (Seller, Stoll & Chavas, 1985) whereas the close-ended format of the CVM tended to yield more plausible results. Seller *et al* (1985) also showed that the close-ended format of the CVM yielded a similar surplus to that of the Travel Cost Methodology. Smith (1993) offers an extensive comparison of the CV method to other methods. The comparison study involved analysing the results of fourteen studies that used the CV method as well as various other methods. His (Smith, 1993) conclusion that the CVM is comparable in terms of performance with other approaches is generally accepted.

3.6 THE TRAVEL COST METHOD (TCM)

The travel cost method (TCM) attempts to place a value on a non-market environmental “commodity” by drawing conclusions from expenditures made to “consume” the good, primarily the cost of travelling to the site, entry fees, on-site expenditures, and outlays on capital equipment used at the site (Kennedy, 2000). There are two types of TCM: the individual demand approach and the more commonly used zone of origin approach. An outline of the zone of origin approach is given below; it draws on studies by Kennedy (2000) and Lee (1993):

Firstly the area around the site is partitioned into zones. The next step is to collect data concerning key variables through an on-site survey of site users. Key variables typically include.

1. Zone of origin.
2. Time taken for the trip.
3. Expenditures en route.
4. Cost of any equipment used on site.
5. Entry fee or licence fee paid.
6. Socioeconomic variables (including, income, age, education, gender, etc.).

The travel cost for user i is then estimated from the survey data on that user, using fixed values for time cost (an opportunity cost inferred from wage rates can be used, but as is shown later can be problematic) and distance cost per kilometre (a common value used is the AA mileage cost but again this can cause problems). Travel cost includes all costs incurred by the user to use the site, including on-site costs.

From the information collected during the survey phase, a trip generating function (TGF) is then estimated as:

$$v_k = v(c_k, x_k, P_k)$$

where v_k is the number of visitors from zone k , c_k is the average travel cost for visitors from zone k , x_k is the vector of average socioeconomic variables for zone k , and P_k is the population of zone k .

The estimated TGF can then be used to derive a demand curve for visits, by plotting the estimated number of visits against travel cost. The area under this demand curve is the total consumer surplus associated with the site (see figure 3d), and as such represents a measure of the use value of that site (Kennedy, 2000).

3.6.1 Theoretical Developments

Hanley (1989) in Lee (1993) develops a travel cost methodology for the valuation of non-market environmental commodities in a more formal and sophisticated manner through the following function:

$$V_{ij} = v(TC_{ij}, D_{ij}, D_{ik}, S_i, A_j, PF_{ij}, W_{ij})$$

Where:

V_{ij} represents the number of recreation trips taken by the household "i" to site "j" during the year of survey.

TC_{ij} represents average recreation expenditure (including transportation costs, entry fees, and miscellaneous expenses) incurred by the household.

D_{ij} represents the two-way distance from the household "i" to site "j".

D_{ik} represents the two-way distance from the household "i" to alternative site "k".

S_i represents the socio-economic status of the head of household "i". This is defined by age, education in years, occupation, place of residence, and income bracket.

A_j represents the attraction index of site "j", defined as the percentage of recreational activities offered by the site relative to total activities offered by all sites, which reflects imperfect substitutability among sites.

PF_{ij} represents the preference for site "j" by household "i", defined as the percentage of trips taken to the site relative to all recreation trips.

W_{ij} represents the maximum amount of money household "i" would be willing to spend per annum on the type of recreation offered by site "j".

As in the previous model the recreation demand equation above is estimated with data gathered from the survey phase. This equation, however, captures more than the model discussed by Kennedy (2000) and Lee (1993). In addition to travel costs it introduces other variables that are also important in modeling demand. These include income levels, socioeconomic status, alternative sites, and preferences (Lee, 1993)

3.6.2 Evaluation of The Travel Cost Method

Evaluations of the TCM have in general not been favourable, as several flaws in the process have been highlighted:

The first flaw is that the method has difficulty in accounting for multi-purpose trips. Visitors to a site can be classified as either purposeful visitors or meanderers (Kennedy, 2000). Meanderers visit the site in the course of a larger trip that includes visits to a number of nearby sites and thus only a portion of the total travel cost for meanderers can be attributed to any particular site visited. One method used to mitigate this bias is to ask respondents to rate the importance of the site in question in their overall trip (for example from one to ten), and weight the total travel cost accordingly (Kennedy, 2000). It does however depend on a largely subjective response from those being interviewed and as a result provides some scope for criticism.

Secondly calculation of distance cost poses additional problems. Kennedy (2000) notes that the cost-per-kilometre travelled could be calculated as either the cost of fuel only, or as the "full cost of motoring", which would allow for vehicle wear and tear and depreciation. Ideally, the marginal cost of the trip should be used, but calculating the full marginal cost of motoring as opposed to average cost is often prohibitively difficult Kennedy (2000).

As mentioned previously, the appropriate measure of time cost is opportunity cost. If time spent on a trip would otherwise have been spent at work, then the appropriate time cost is the value of foregone earnings. In many situations, however, time spent on a trip would otherwise have been spent in an alternative leisure activity, which may be worth more or less than foregone earnings (Kennedy, 2000). This problem is further complicated by the fact that the trip itself may be of some value to the respondent, for example if the drive to the site is a scenic and pleasant one. To overcome this problem researchers can ask visitors whether or not they “enjoyed the drive”, and use a zero time cost for those respondents who did, and a fraction of the minimum wage rate for those who did not (Kennedy, 2000). Again there is scope for criticism as responses are subjective.

In contrast to the above criticisms, Cameron’s (1992) study draws on the positive aspects of both the TC method and the CV method to develop a united model from which it will be possible to measure existence value (see figure 3a). In this model TC data and CV data is collected and from this a joint model is estimated in the context of a single sample of respondents. He (Cameron, 1992) argues that the travel cost data captures current user behavior while the contingent valuation data will help in the understanding of preferences by providing insight into probable (or future) behaviour under hypothetical conditions. Cameron’s (1992) study emphasizes that the TCM is limited to the valuation of non-market goods for current users and cannot be applied to non-users. In addition to this the CVM is restricted to hypothetical conditions, but can be applied to preferences of future users and non-users as well. As a result, the combination of these two methods has the potential to form a link between stated preferences of non-users and the (indirectly) revealed preferences of users. This will provide a base from which non-use demand (existence value) can be measured (Cameron, 1992).

3.8 TOWARDS A VALUATION PROTOCOL

The above review confirms the generally accepted idea that economic methods can be used estimate the values of certain types of environmental “goods” or services. Smith’s (1993) comparison study (mentioned in the CVM section of this review) accumulates the empirical experience of many valuation methods from a variety of situations and conditions. From this experience the aspects of each method that influence the accuracy of the estimated value can be highlighted and provide the direction needed for further study. However, as Smith (1993)

notes, moving from literature based on diverse case studies to a more organized set of welfare measures will require a standardized set of definitions for the services (or goods) provided by environmental resources. It is also important to recognize the limitations of valuation methods. However, instead of completely avoiding these methods, the analyst should report his or her results in a way that makes others aware of the issues encountered in the study (Bowker & Stoll, 1988). They (Bowker & Stoll, 1988) point out that for policy-orientated analysis it is often necessary to choose or “suggest” an estimate for the value of a resource. This is due to the fact that there are often budget constraints placed on the policy-maker as well as an underlying sense of urgency to complete the analysis. In light of this professional judgment plays a major role in using valuation techniques effectively.

Smith (1993) proposes a course of action that involves firstly the development of a definition structure that can be used to organize environmental services into classes. Possible methodologies should then be evaluated in terms of the following criteria:

1. The method must be consistent with the general public’s perception of the services that the resource provides.
2. The method must be compatible with the constraints on and interrelationships between the natural resources that provide the services.
3. The methodology must also be responsive to policy needs for valuation information.

To this end many resource-related organizations are developing databases to document valuation studies as well as guidelines for natural resource damage assessments (Smith, 1993). The following chapter draws on the theoretical considerations discussed in this chapter to develop a survey instrument aimed at probing the Plettenberg Bay Public’s preference toward the provision of public environmental services.

CHAPTER 4: STUDY METHODOLOGY

4.1 INTRODUCTION

This chapter provides an explanation of the various methods and concepts that have been applied in this study. The chapter describes the CV method as a means of determining the value of a Bay Management Plan to the various users of the Bay. This includes an identification of assumptions made, the treatment of the collected data and the a priori outcomes of the models for willingness to pay.

4.2 PLACING A VALUE ON A BAY MANAGEMENT PLAN USING THE CV METHOD

The primary objective of this study has been to place a value on the recreational value of Plettenberg Bay to the people who frequent the Bay. The CV method has been used to achieve this goal by asking those who derive use and non-use value from the Bay how much they would be prepared to pay to maintain the quality of the Bay through a management programme for the Bay. To this end a carefully designed survey has been conducted to ascertain willingness to pay for this programme (see appendix 1). The survey was designed to capture data that could be used to model willingness to pay by the population groups that frequent the Bay. The model provides a means to validate the accuracy of the resulting willingness to pay figures as it allows the economic behaviour of respondents to be compared to conventional economic theory.

4.2.1 The Contingent Valuation Model For Willingness To Pay Amongst Bay Users

An individual's willingness to pay for an environmental good is dependent on a number of factors; these include a vector of socioeconomic variables in conjunction with the individual's attitude towards the environment and their perception of the quality of the good. To this end the following model of willingness to pay is proposed:

4.2.2 Probing The Reliability Of The Model Through Regression Analysis

To compare the actual performance of the model with the above expected outcomes the relationship between willingness to pay and the explanatory variables is estimated through regression analysis using the ordinary least squares (OLS) method, the regressions modelled are in a multiple log-linear form. The statistical significance of each explanatory variable in addition to the overall explanatory power of the model provides the basis for the discussion of results in chapter 5.

4.3 SURVEY INSTRUMENT DESIGN

This section describes the way in which the survey instrument used in this study was designed, an explanation of the features included in the instrument and their development is also included.

4.3.1 Contingent Valuation Sections

The survey was broken down into four sections. Section A probed respondents' general attitude toward the environment and included questions regarding the importance of environmental issues in relation to issues such as HIV/Aids, unemployment, crime and education in South Africa. Insert 4a below illustrates the first attitudinal question posed to respondents:

Insert 4a: Survey Section A – General Attitude Towards Environment

| | | | | | | |
|---|---|---|---|---------------------------------|---------------|----------------|
| 1. How important do you think environmental concerns are in comparison to issues such as HIV/AIDS, unemployment, crime and education? | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6. Don't Know | |
| not important | | | | | | very important |
| → | | | | | | |
| 2. Do you or any of the members of your household support (eg donations of money or time) any environmental conservation group/programme? | | | | | | |
| Y | N | | | if Y which one how? | | |

Respondents were also asked whether they supported any type of environmental conservation group or programme. Where respondents did offer support they were questioned as to whether their support was in monetary form or in the form of donation of their time to the initiative. The answers to this question have been used in conjunction with other questions

within the instrument to provide a weighted indication of the respondents' environmental attitudes, the purpose of which is to analyse environmental attitudes as an explanation for variance in people's willingness to pay for the proposed management program. The questions in this section also act as indicators of various biases associated with CV methodology. Strategic biases in the form of protest zeros and free riding would be picked up through the analysis of these questions in conjunction with the questions in section B.

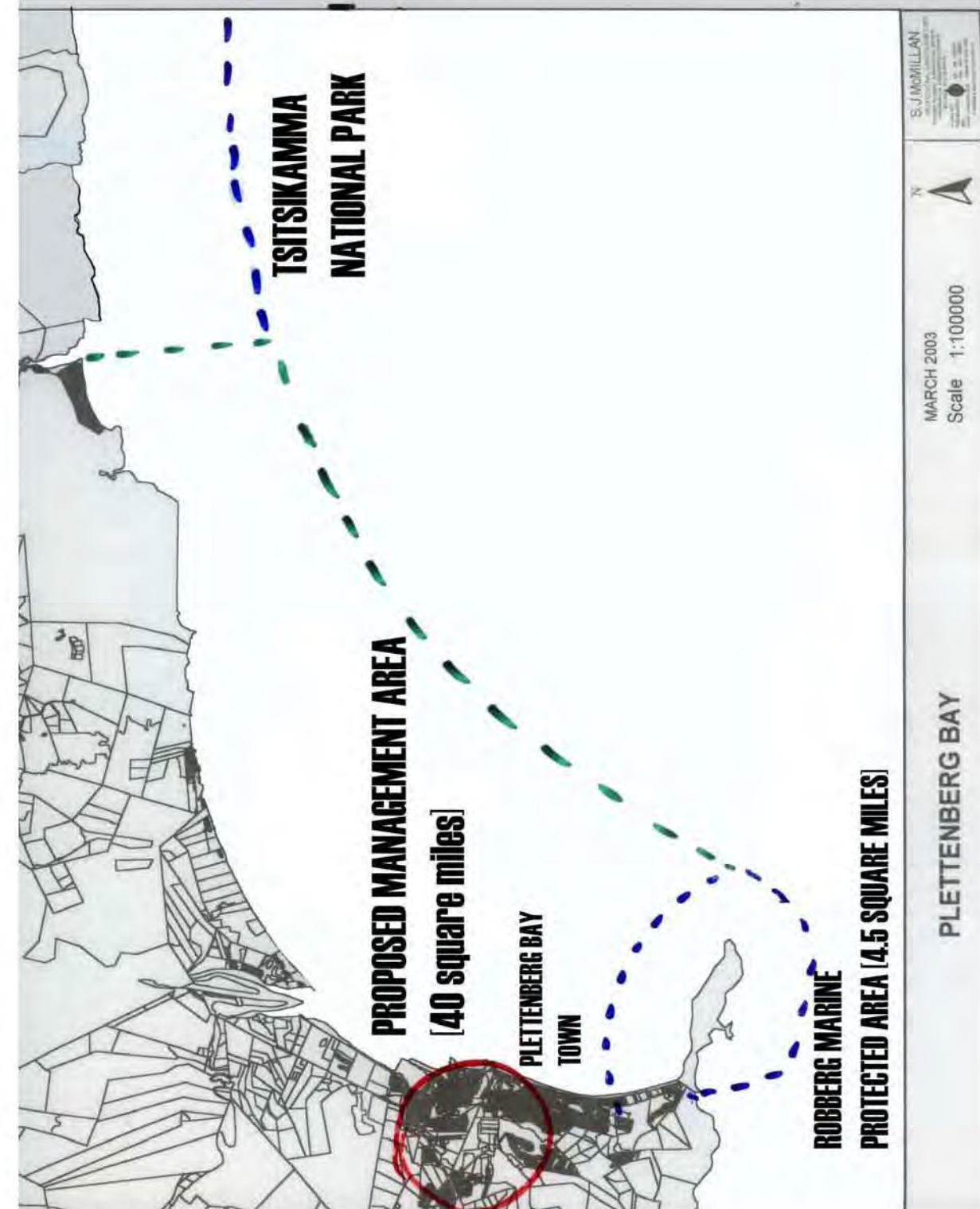
Section B further explores respondent's environmental attitudes in the context of Plettenberg Bay's Environment. In keeping with the NOAA panel's guidelines for value elicitation surveys information presented in each section has been made as rich as possible (Arrow *et al*, 1993). To this end a number of photographs were presented to respondents at this point, these included a photograph of the bay and some of the marine animals that inhabit the Bay. Also included was a map of the Garden Route showing the location of Plettenberg Bay in relation to other towns and cities. All photographs presented an objective view of the Bay and its inhabitants as they currently exist (See Appendix 2). The reason for this is that as the NOAA panel cautions, the dramatic nature of photographic aids can lead to responses based more on emotional than consumer behaviour (Arrow *et al*, 1993).

The questions in this section served the additional purpose of stimulating respondents into thinking about the issues involved in the survey and for the interviewer to get an indication of the respondent's level of knowledge about Plettenberg Bay.

4.3.1.1 The Contingent Valuation Scenario

Section C presented the respondents with the CV scenario and again the information provided was as made as extensive as time constraints allowed (Arrow *et al*, 1993). Information included the geographical position and size of the management area involved in the scenario in relation to current protected areas on either side of Plettenberg Bay (See insert 4b below).

Insert 4b: Map of Plettenberg Bay and surrounding area used in the survey (Map one)



| Key: | |
|--------------------------------------|--------------------------|
| — | Plettenberg Bay Town |
| — | Current Marine Reserves |
| — | Proposed Management Area |

Respondents were made aware that the proposed managed area would not become a ‘no take zone’ as the Robberg and Tsitsikamma Reserves are, rather that regulation monitoring and enforcement would become a reality as opposed to the current distinct lack of such activities. This point was emphasised to ensure that the value elicited from respondents was indeed for a sustainably managed area as opposed to a marine reserve (see insert 4c below). The care taken to adequately define the programme was to ensure that respondents were not expressing ‘ideological values’ or ‘purchasing moral satisfaction’ in expressing their willingness to pay for the programme (Carson & Mitchell, 1993). This was tested during the survey process and is detailed below in section 4.3.1.2.

Insert 4c: Survey Section C – Contingent Valuation Scenario

Please listen carefully to the following information about Plettenberg Bay which is the area shown in the following map: **(SHOW MAP 1)**

Scenario – Bay Management Plan

Plettenberg Bay is well known for its scenic beauty and natural resource wealth. The marine environment is particularly attractive to fishermen both recreational and commercial as well as to more passive users such as whale watchers, kayakers and hikers.

Proposed Situation

The dark green border on this map highlights the boundary for a potential Managed Marine area.

(expand on the term for respondent):

any area of coastline which has been reserved by law to manage the enclosed environment in a sustainable way . Managed Marine areas are an effective way of bringing all human activities in such areas under an integrated management plan to ensure that they do not destroy the basis of the ecosystem

This area contains reefs that have been designated as needing protection from over utilisation and the constitutes a total of 40 square miles which is approximately 9 times larger than the current Robberg Reserve.

If the Management plan is implemented, managed use of the marine resources will lead to the biological quality of the bay being maintained and gradually improved thereby guaranteeing the livelihoods of those who depend on the Bay. The management plan will also improve the monitoring of and compliance to current coastal regulations and will provide additional job opportunities for implementing agents. If the management plan is not implemented bio-diversity of the area (particularly the reefs) will be lost as it will not be possible to control the activities that are currently reducing the quality of the bay.

Care was also taken to make the scenario as understandable, believable and meaningful as possible. The objective of which was to ensure that all respondents had a similar basic understanding of the scenario before the value elicitation questions were asked (Horton *et al*, 2001).

The maximum willingness to pay for environmental goods has been shown to elicit lower values than the willingness to accept compensation for the loss of such goods (Arrow *et al*, 1993). To ensure that conservative measures of value have been arrived at in this study WTP format has been employed. In addition to this respondents were clearly made aware of the fact that any money paid towards the Bay Management Plan would leave them with less disposable income to spend on other goods and services and budgetary requirements

Respondents were asked how much they were willing to pay annually to ensure that the Bay Management Program was successfully implemented. The most common method in use today is a referendum method, the basis of which is a 'yea' or 'nay' vote to paying a pre specified amount. This is the method that the NOAA Panel recommends (Arrow *et al*, 1993), the reason being that truth telling is the optimal strategy for the respondent which means that it is incentive compatible (Hoehn & Randal, 1987). In this study however, a payment ladder approach was adopted. The reason for this is that when respondents are evaluating goods that they are not used to valuing (a Bay Management Plan arguably fits this description) the referendum format can lead to strong anchoring effects and starting point bias (Horton *et al*, 2001). The payment card included payment ladders in a range of currencies to allow tourists from different countries a means to more effectively and accurately present their WTP. Although the bid levels were not pre-tested, a wide bidding range was included in all currencies to avoid range and centring biases that may occur when the payment card excludes the upper end of the value distribution that respondents may desire to select.

Having been subjected to the CV scenario, but before the WTP question was asked, respondents were asked whether or not they would be prepared to pay at least something towards the programme. This allows for respondents to record a protest bid or refusal to value the good (Horton *et al*, 2001). Follow up questions as to the reasons why they refused to value the good distinguished these protest zero bids from true zero bids for the good. The analysis of the reasons behind positive responses to this payment principle question will also provide insight into the nature of the value respondents place on the programme (see Appendix 1 question C4).

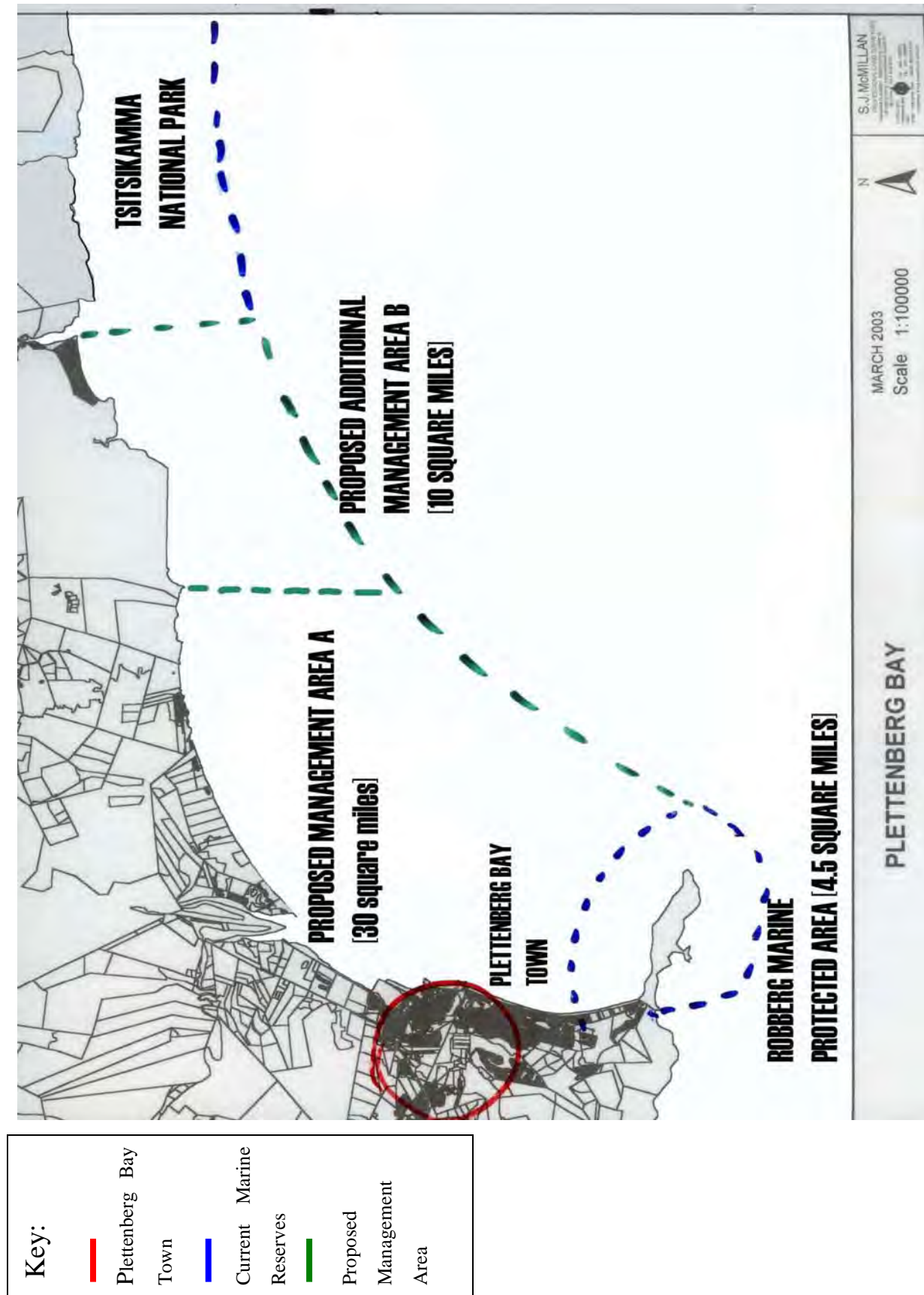
To ensure that WTP results reflect respondents' actual valuation of the good in question and to avoid biases associated with the vehicle of payment, the payment method must be as plausible and realistic as possible. Current vehicle of payment best practice involves the introduction of a taxation system to receive revenue, again this is the NOAA Panel's recommendation (Arrow *et al*, 1993). For the purposes of this study, a local environmental tax payment vehicle was used when surveying local residents. International and domestic tourists we treated differently to the local Plettenberg Population as it was believed that due to the nature of their visits they could not be realistically expected to contribute towards a locally based tax. Initially increased visa costs or airport taxes were considered, however these methods failed to take into account multi destination and multi purpose visits. It was thus decided that a daily tourist levy included in accommodation costs would seem more realistic to tourists. Respondents were asked to state their willingness to pay for the scenario in the currency that they were most familiar with, to this end the payment scale in the survey included amounts quoted in Rand, US dollars, Euro and Pounds. The amounts stated were then converted to rand at the respective exchange rates at the time the survey was conducted. The different payment scenarios are shown in Appendix 1

4.3.1.2 A Test of Consumer Rationality and Internal Consistency

As emphasised by the NOAA panel (Arrow *et al*, 1993) and outlined in chapter 2, a CV study that does not demonstrate people's sensitivity to the scope of the scenario may be seriously flawed in terms of the way it has been designed. To this end a test of scope sensitivity was conducted with the initial sample of local Plettenberg Bay residents.

The initial sample of respondents was asked to value differing levels of the good in question. This was achieved by asking people to value an initial Bay Management Plan that would involve an area that covered 30 square miles (see insert 4d below). Once they had provided a WTP figure for this scenario they were asked to value a Bay Management Plan that involved an area that covered 40 square miles, including the initial 30 square miles (see insert 4d below). A priori expectations would suggest that people would be WTP more for a greater amount of the good (Horton *et al* 2001). The results of this experiment are presented in the result section of this document. They suggest that the respondents were indeed sensitive to the scope of the programme, which suggests that there is internal consistency to the survey instrument and that from a rationality point of view the resulting WTP figures are plausible.

Insert 4d: Scope Test Map



4.3.2 Socioeconomic Indicators

Section D was aimed at collecting the various socioeconomic indicators that were used in the analysis of WTP across the samples. These indicators include age, sex, educational level, income level, marital status and the number of dependants in the household. The rationale for placing these questions toward the end of the survey was that respondents are more likely to be at ease with the interviewer, less likely to take offence at being asked personal questions and thus more likely to respond truthfully (Horton *et al*, 2001). Foreign tourists were asked to state their income bracket in terms of the currency that they were most familiar with, it was believed that this would yield more accurate results than asking this sample to quote their income in Rand. The income brackets stated by respondents were then converted into Rand at the prevailing exchange rate⁸ at the time of the survey.

CHAPTER 5: RESULTS AND DISCUSSION

5.1 INTRODUCTION

This chapter discusses the results obtained through the implementation of the survey described in chapter 4. The survey was conducted over the period of April – October 2003 and involved three separate groups of resource users namely the local Plettenberg Bay population, domestic tourists and foreign tourists. Data was collected through an in-person interview that took between ten and fifteen minutes, depending on how opinionated the respondent was. The local Plettenberg Bay population was sampled according to the demographic profile described in chapter 1 and interviews were conducted in the main CBD of Plettenberg Bay. Kwanokthula is a satellite community of relatively low-income members of the population. In light of this, the survey was also conducted in the Kwanokuthula Community Centre to ensure a representative sample of the population. For the Kwanakuthula surveys a translator was employed to provide respondents with the Xhosa translation of aspects of the survey instrument if they did not understand the English version. Tourists to Plettenberg Bay were also subjected to an in-person interview and were sampled at Plettenberg Bay’s Central Beach as well as the CBD. The results from these three surveys are outlined below. In total 119 respondents were interviewed, the sample proportion according to user group is shown in table 5a below:

Table 5a: Survey respondents by proportion of the total number of users interviewed

| User | Number of Interviews | Percentage of Total |
|----------------------------------|----------------------|---------------------|
| Local Plettenberg Bay Population | 51 | 42.8 |
| Domestic Tourists | 34 | 28.6 |
| Foreign Tourists | 34 | 28.6 |
| Total | 119 | 100 |

5.2 CONTINGENT VALUATION SURVEY RESULTS

5.2.1 Data Clean Up

Before the data was included in the WTP analysis, a number of responses were excluded from the sample. The reasons for the exclusion were the occurrence of outlier bids as a result of strategic biases (Lee, 1993) and protest ‘zero’ bids. Protest zero bids result from respondents who refuse to accept the proposed scenario and thus fail to reveal their preferences regarding

the amount of the service they desire while strategic responses are those that have been overstated to improve the probability of the Management Program being implemented. For the purposes of this study protest zero responses have been excluded from the analysis following and responses that exceed 5% of the respondent's income have also been excluded (Diamond & Hausman, 1994).

Out of the Plettenberg Bay local population sample 9 protest zero bids were recorded (18% of the sample). The reason for 44% of the protest zero bids was that the government should pay, 33% claimed that taxes were too high already and the remaining 23% of these respondents said that they did not trust the Government as the implementing agent. One outlier bid was recorded as the respondent's stated willingness to pay exceeded the 5% of their monthly income and in all 41 usable observations were collected from this sample.

The domestic tourist sample yielded a proportionally higher number of zero bids, in total 29% of the sample stated zero bids. Of these zero bids however, only 9% of the sample refused to accept the payment scenario proposed in the survey stating that they either did not trust the government to implement the plan (33%), believed the Government should pay for the plan (33%), or that the Bay should be protected by law (33%). These protest zero bids were excluded leaving a sample of 31 observations including the balance of the zero bids (23% of the sample).

The foreign tourist sample yielded 3 protest zero bids, constituting 9.68% of the sample. Two of these respondents claimed that the government should pay while the third respondent stated that the problems being experienced in Plettenberg Bay were not a priority. These three responses were excluded from the analysis leaving 31 observations to include in the foreign tourist WTP model.

5. 2.2 Sample Population Descriptive Statistics

The overall purpose of the contingent valuation survey, as described in chapter 4 has been to gain insight into the willingness to pay for a Bay Management Program by the various users of the Bay. Descriptive statistics regarding the data collected from the three user groups are presented below. The descriptive statistics provide an indication of the nature of the data collected in terms of the variables used to develop the model of willingness to pay in this study. They also allow for a comparison of the local Plettenberg Bay sample to the

socioeconomic baseline for the local Population. These statistics are presented below in tables 5b, 5c and 5d:

Table 5b: Descriptive Statistics calculated for the Local Plettenberg Bay Sample

| Variables | Mean | Median | Maximum | Minimum | Std.Dev ¹ | Observations |
|--|-------------|-------------|-------------|-------------|----------------------|--------------|
| Age | 36.9 | 34.0 | 59.0 | 21.0 | 10.2 | 41 |
| Household size | 2.9 | 3.0 | 6.0 | 1.0 | 1.5 | 41 |
| Education (1= <matric, 2=matric, 3= >matric) | 1.9 | 2.0 | 3.0 | 1.0 | 0.7 | 41 |
| Income (Rand, weekly gross) | 533 | 558 | 809 | 58.0 | 270 | 41 |
| Marital Status (m = 0, s = 1) | 0.5 | 1.0 | 1.0 | 0.0 | 0.5 | 41 |
| Sex (f = 0 , m = 1) | 0.5 | 0.0 | 1.0 | 0.0 | 0.5 | 41 |
| Willingness To Pay² | 14.6 | 10.0 | 80.0 | 0.0 | 15.4 | 41 |

¹ Std. Dev. is Standard Deviation

² WTP figure represents monthly figure for the local Plettenberg Bay sample for the whole valuation scenario

In total 41 Plettenberg Bay residents were included in the analysis, with an average age of 36.9 years old and the average respondent having attained their matric exemption. The median weekly income bracket is the third census bracket (R347- R808) with the average respondent coming from a household of 3 people. Census 1996 data places the median income earner in the second income bracket (R116-R346) which suggests that the sample population is biased towards higher income earners.

This may well lead to an overestimate of the local Plettenberg Bay population's WTP for the Bay Management Program which could limit the usefulness of the WTP estimates arrived at through this study. However if one considers the fact that the Census data is seven years old and that considerable economic development has occurred along the Garden Route since the Census was undertaken, it could be argued that the bias towards higher income earners is not as pronounced as the Census data indicates. In addition to this, if one considers the effects of inflation on wage rates over the last seven years and the underlying conservative nature of the survey instrument concerns regarding the average WTP figure presented in table 5b above being an overestimate of true WTP are further dispelled.

The average household size of 3 persons is slightly below the figure of 3.85 persons per household that is currently used by the Plettenberg Bay Municipality to arrive at population estimates (Ratepayers Review, 2003), but nevertheless leaves the survey sample as an acceptable representation of the Plettenberg Bay Population.

The mean willingness to pay for the Bay Management Program by the local Plettenberg Bay Population is estimated to be R14.59 per month (R175.08 per annum) with a standard deviation of 15.37; this is the willingness to pay figure for the complete valuation scenario described in chapter 4. The results from the scope sensitivity analysis follow in section 5.2.6

Table 5c: Descriptive Statistics calculated for the of Sample Domestic Tourists to Plettenberg Bay

| Variables | Mean | Median | Maximum | Minimum | Std. Dev. | Observations |
|--|-------------|---------------|----------------|----------------|------------------|---------------------|
| Age | 41.1 | 43 | 69 | 22 | 13.9 | 31 |
| Household size | 2.6 | 3 | 5 | 1 | 1.5 | 31 |
| Education (1=<degree; 2=degree; 3=> degree) | 1.5 | 2 | 3 | 1 | 0.5 | 31 |
| Income (Rand, Gross Monthly) | 7226 | 7000 | 15000 | 2000 | 3245 | 31 |
| Marital Status (1= married; 0= single) | 0.6 | 1 | 1 | 0 | 0.5 | 31 |
| No. of days on site | 5.4 | 5 | 14 | 1 | 3.4 | 31 |
| Sex(1= f; 0=m) | 0.4 | 0 | 1 | 0 | 0.5 | 31 |
| Willingness to Pay¹ | 5.9 | 5 | 20 | 0 | 6.5 | 31 |

¹ WTP represents daily WTP for 'tourist tax'.

The average domestic tourist sampled was 41 years old, coming from a household of approximately 3 people. The median education level was a degree and the average income level was R 7225 per month. These indicators place domestic tourists in a higher socioeconomic category than the average member of the Plettenberg Bay community. The average daily WTP for this sample was R5.97, which is considerably more than the daily WTP for the local Plettenberg Bay sample (R0.49). Although domestic tourist annual WTP is only a fifth of the local population's annual WTP, it is still significant if one considers that the average domestic tourist only spends 6 days on-site a year. The higher socioeconomic status of domestic tourists provides an explanation for this trend and the results from the model for

WTP in section 5.2.7 support the fact that the vector of socioeconomic indicators has a significant effect on a respondent's WTP for the Bay Management Plan.

Table 5d: Descriptive Statistics calculated for the Sample of Foreign Tourists to Plettenberg Bay

| Variables | Mean | Median | Maximum | Minimum | Std. Dev. | Observations |
|--|--------------|--------------|---------------|--------------|--------------|--------------|
| Age | 43.7 | 40 | 72 | 26 | 13.2 | 31 |
| House hold size | 1.6 | 1 | 4 | 1 | 1.1 | 31 |
| Education (1= <degree, 2=degree, 3= >degree) | 1.7 | 2 | 3 | 1 | 0.7 | 31 |
| Environmental attitude | 4.2 | 4 | 10 | 1.25 | 2.7 | 31 |
| Income (Monthly Gross) | 43851 | 35632 | 105312 | 15000 | 23481 | 31 |
| Marital Status (m = 0, s = 1) | 0.6 | 1 | 1 | 0 | 0.5 | 31 |
| Perceived Quality | 0.7 | 1 | 1 | 0 | 0.5 | 31 |
| No. of days on site | 2.5 | 2 | 5 | 1 | 1.1 | 31 |
| Sex (f = 0 , m = 1) | 0.4 | 0 | 1 | 0 | 0.49 | 31 |
| Willingness To Pay¹ | 22.4 | 11.7 | 117 | 0 | 27.2 | 31 |

¹ WTP represents daily WTP for 'tourist tax'.

The average foreign tourist sampled in this study was 43 years old, coming from a household of just under two individuals. The mean monthly income was R43 851.49, considerably higher than the local Plettenberg Bay and domestic tourist samples. This, in conjunction with the fact that foreign tourists had higher education levels than both the local Plettenberg Bay and domestic tourist levels suggests that foreign tourists come from a higher socioeconomic standpoint than the other sample populations. This may well explain the considerably higher WTP estimate for this sample (R22.40 per day) when one considers that the average amount of time spent on site by foreign tourists is just under two and a half days. An additional explanation for the high foreign tourist WTP estimate, considering that on average only two and a half days are spent on site, is the significant role that non-use bequest and future option value plays in this sample group's perception of the Bay's value. This hypothesis is further explored in section 5.2.3 below:

5.2.3 Rationale For Responding Positively To The Payment Principle

Before respondents were asked to reveal their WTP for the Bay Management Programme they were asked whether or not they would be willing to contribute any amount to the programme. Respondents who provided positive responses to this question were then asked to motivate their positive responses and were encouraged to ‘think aloud’ when responding. The purpose of this was to allow their responses to be classified according to seven possible response categories. The categorisation of responses reveals the nature of the value respondents place on the Bay Management Program according to the analysis of value illustrated in figure 2a, chapter 2. The question posed to respondents and their corresponding responses are presented below:

Insert 5a: Payment Motivation Question – Survey Section C

| |
|--|
| C4. What is the most important reason why you would be prepared to contribute towards a tax to implement this Management plan? (Not to be shown to respondent) |
| 1. it is a good cause |
| 2. I would receive some personal benefit from paying |
| 3. we should improve the environment for future generations |
| 4. I want to be able to visit Plettenberg Bay in the future |
| 5. I am concerned about losing biodiversity in the Bay |
| 6. my answer reflects my views on the need to preserve South Africa’s entire coast line, not just this area of the coast |
| 7. other |

Table 5e: Responses to payment motivation question by population sample

| Response Option | Percentage of Respondents per sample ¹ | | |
|---|---|-------------------|------------------|
| | Local Plettenberg Bay | Domestic Tourists | Foreign Tourists |
| 1. Good cause | 2.64 | 8.33 | 3.23 |
| 2. Receive Personal Benefit | 5.26 | 4.17 | 9.68 |
| 3. Improve environment for future generations | 55.26 | 37.50 | 38.71 |
| 4. Visit in the future | 2.64 | 33.33 | 19.35 |
| 5. Concerned about bio-diversity loss | 21.05 | 16.77 | 16.13 |
| 6. Need to preserve the entire SA coast | 0 | 0 | 12.90 |
| 7. Other ² | 13.15 | 0 | 0 |
| TOTAL | 100 | 100 | 100 |

¹ The above analysis includes the entire population samples, before protest zero and strategic responses were excluded. There was overlap in responses to this question, with many respondents having a number of responses. As a result the respondents’ most important motivation was used.

² Job creation was the other motivation for the local Plettenberg Bay population accounting for 13.15% of the sample.

The first and second motivation options were included to detect signs of ‘warm glow’ effects, signifying that respondents were ‘purchasing moral satisfaction’ in stating their willingness to pay for the programme (Carson & Mitchell, 1993). A total of 9% of the local Plettenberg Bay population responded with these motivations (3% believed that the programme was a good cause and 6% stated that they would receive some personal benefit from the program). This suggests that the survey was not without the effects of ‘warm glow’ bias, however, the relatively low percentage of these responses means that the results have not been compromised by this bias. Another interesting result is that 13% of the local Plettenberg Bay population stated that the Bay Management Plan would create additional jobs within the community, if the Plan were to be implemented this would certainly occur, and points to the fact that respondents not only accepted the hypothetical scenario but took cognisance of the ramifications of the Plan.

12% of the domestic tourist sample responded positively to the first two motivation options (8% believed that the program was a good cause while 4% of the sample would receive some personal benefit from contributing to the program). Although higher than the local Plettenberg Bay sample the effects of the ‘warm glow’ bias in the foreign tourist sample is still acceptably low. Similarly 13% of the foreign tourist sample responded positively to the first two motivation options, with 3% believing the program to be a good cause and 9.7% gaining some personal benefit.

The motivation for the majority of the local Plettenberg Bay sample (55%) for the programme was that the environment should be improved for future generations. Another 21% of this sample said that they were concerned about the loss of biodiversity in the Bay. This suggests that non-use values are indeed a significant factor in terms of the valuation of the Bay: Improving the environment for future generations (option 3) points to the occurrence of non-use value stemming from bequest value while the concern for loss in biodiversity points to the occurrence of existence value.

Improving the environment for future generations accounted for 38% and 39% of the motivational responses in the domestic and foreign tourist samples respectively. This again points to the importance of non-use value stemming from bequest value. In addition to this 33% and 19% of the domestic and foreign tourist samples respectively stated that they wished

to visit Plettenberg Bay in the future. This suggests the presence of option use value derived from the knowledge that if the Bay Management Program were to be successful, respondents would be able to come back to the Bay in the future and consume the benefits that they would have paid for. Non-use value has been shown to be a significant component of the value people place on the Bay, its significance points to the need to include this aspect of value in future policy decision-making processes.

5. 2.4 The Presence Of Strategic Bias

To investigate the effects of strategic bias on respondents' stated WTP, a follow-up question to the main WTP elicitation question was posed in which respondents were asked to state why they had chosen the specific amount that they had (Appendix 1 question C6). 8% of the local Plettenberg Bay sample responded that 'this would be enough if everyone paid the same amount', as did 18% of the domestic tourist sample and 29% of the foreign tourist sample. This suggests that to these respondents, the amount paid by others is an important consideration when expressing their WTP which in turn indicates that strategic intent may have influenced the estimates stated by these individuals (Horton *et al*, 2001). However, as Bohm (1984:140) notes, consideration of the amount paid by others may indeed lead to a more accurate reflection of the individual's preference toward the good in question in cases where WTP bids are expected to be seen by others from a solidarity or charity point of view.

The majority of the local Plettenberg Bay sample responded that the amount that they had stated was either the most they could afford (61%) or that it was the most that they were prepared to spend on environmental issues in Plettenberg Bay (32%). This suggests that the majority of respondents took at least some heed of their individual budget constraints.

The majority of the domestic tourist sample stated that the amount they bid was the most they were prepared to spend on environmental issues in Plettenberg Bay (49%) and another 18% indicated that the amount they had chosen was the amount that they would expect to pay for the Bay Management Plan. This trend again indicates that respondents did consider their individual budget limitations.

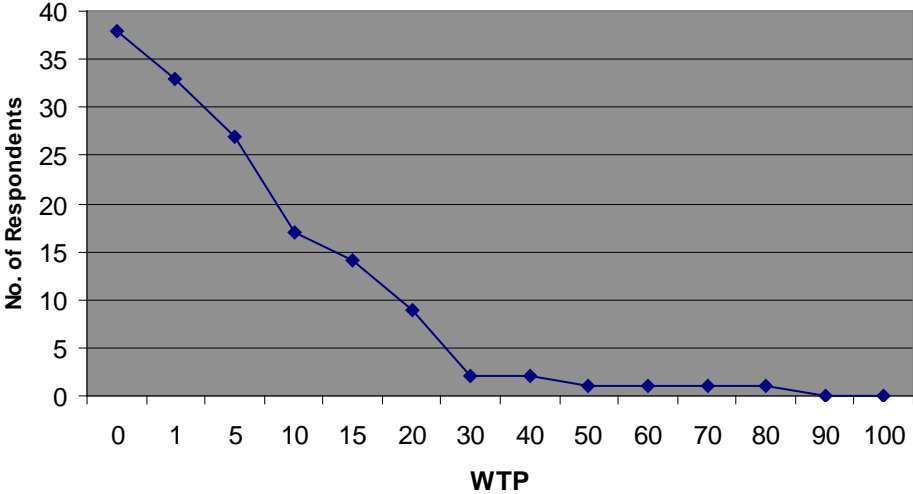
Similarly 32% of the foreign tourist sample indicated that their stated WTP was the most that they were prepared to spend on environmental issues in Plettenberg Bay while 39% of the sample said that their stated WTP was the amount that they would expect to pay for the

environmental good in question. This again indicates the presence of some degree of budget consideration.

5.2.5 The Demand For The Bay Management Plan As An Environmental Good

As Thompson, Berger, Blomquist and Allen (2002:9) note, data collected during a CV study essentially consists of respondent bids regarding a hypothetical scenario as opposed to observations from actual economic transactions. Although every effort has been made to make the scenario as plausible as possible, the hypothetical nature of the survey does give rise to concerns regarding whether the data conforms to orthodox consumer theory. As with all normal goods one expects that as the price of (or WTP for) the Bay Management Plan increases, the quantity demanded of the environmental service the Plan provides decreases. To test this premise the cumulative distribution of WTP within each sample group was analysed, the expectation being that the likelihood of a respondent agreeing to pay a stated amount falls as the price (WTP bid) increases (Thompson *et al* 2002:10):

Graph 5a: The Demand for a Bay Management Plan by the local Plettenberg Bay Sample

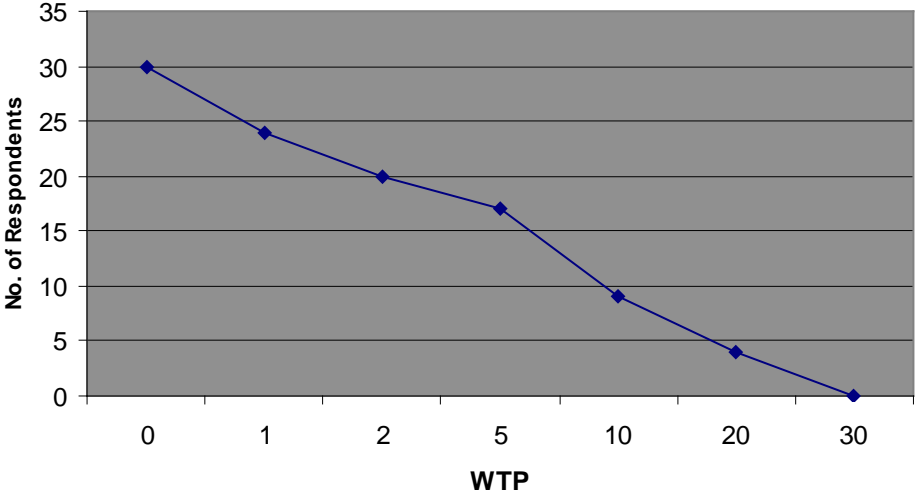


The above graph illustrates the distribution of WTP amongst the local Plettenberg Bay sample. The resultant trend indicates that the respondents' bidding behaviour does conform to *a priori* expectations in that there is a negative relationship between number of respondents and willingness to pay: a greater number of respondents place bids at lower WTP bid levels, with only 5% of respondents stating bids of over R30.

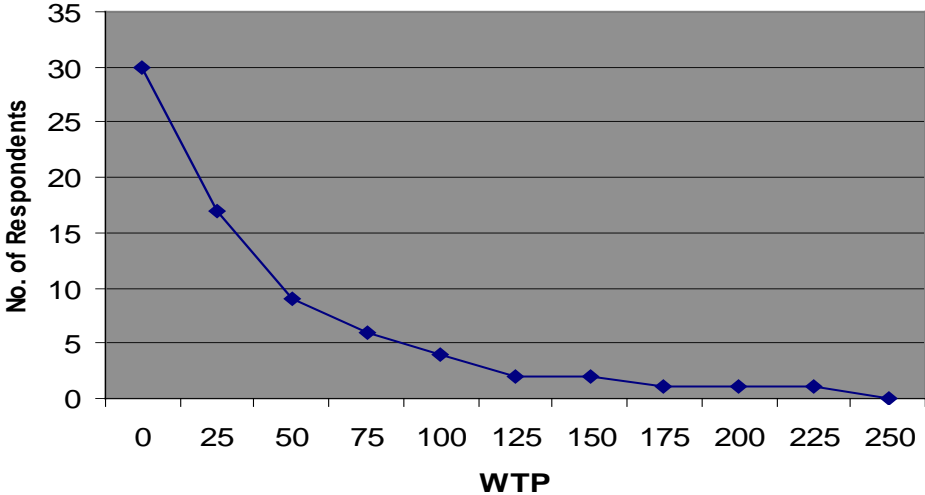
Graphs 5b and 5c below confirm the trend shown by the local Plettenberg Bay in terms of consumer behaviour, the trend in WTP amongst both domestic and foreign tourists is again

consistent with the law of demand for a normal good. At a low price (WTP) a large number of respondents demand the provision of the Bay Management Plan as an environmental service. As the price of provision (WTP bid) increases the number of respondents demanding the service falls. Graph 5b shows that only 13% of the domestic tourist sample stated bids of R20 (the highest bid stated within this sample) while graph 5c shows that just over 6% of the foreign tourist sample bid over R125 for the plan.

Graph 5b: The Demand for a Bay Management Plan by Domestic Tourists



Graph 5c: The Demand for a Bay Management Plan by Foreign Tourists



5.2.6 Testing Respondents' Sensitivity To Scope

The scope sensitivity test⁹ was administered to the first 25 respondents from the local Plettenberg Bay population. Although this represents only a fraction of the total sample, for the purposes of this study it was seen as being reasonable to assume that the consumption behaviour of this sub sample would be representative of the total sample population. This assumption is justified by the fact that the rationale for including the scope test was not to conduct an in-depth analysis of consumer marginal utility but rather to acquire a trend in (or indication of) consumer behaviour.

Table 5f below illustrates the results from the scope test. Respondents were first asked to reveal their willingness to pay for a Bay Management Program covering an initial area A (covering an area of approximately 30 square miles), following this respondents were asked to state their willingness to pay for a Bay Management Program covering an area B which included area A and which was approximately 40 square miles in size.

Table 5f: Proportional increase in Willingness to Pay according to the change in Management Area Size.

| Area Valued | A | B | Proportional Increase |
|---------------------------------|-------|-------|-----------------------|
| Approximate Size (square miles) | 30 | 40 | 0.333 |
| Average Stated WTP (R/month) | 16.80 | 20.04 | 0.192 |
| n | 25 | 25 | |

Table 5f shows that for increasing the management area by approximately a third, the average WTP for the management program increased from R16.80 to R20.04 which yields an increase (marginal utility) of R3.24. This represents a proportional increase in WTP of approximately 0.2 for the increase in management area by a third. These results indicate that the respondents were indeed willing to pay more for an increased amount of the 'good' (a larger management area). WTP, however, has seen a lower proportional increase than the increase in management area size which suggests consumer behaviour in this valuation study abides by the law of diminishing marginal utility:

The basic underlying hypothesis tested by this law is that the utility that the resource user derives from successive units of the environmental good in question decreases as the use or consumption of the good increases (Hoevenagel, 1996). The above results confirm this

because on average, respondents are willing to pay more for the large management area but their WTP increases at a decreasing rate.

5.2.7 A Model For Willingness To Pay – Regression Results

The methodology followed in developing a model for the WTP for a Bay Management Program has been detailed in chapter 4. What has been predicted is that an individual's WTP is dependent on the individual's socioeconomic status in conjunction with their attitude toward the environment and their perceived quality of the Bay. Research studies in the field of contingent valuation (Horton *et al*, 2000) have tended to employ both OLS and Tobit regressions to explore the characteristics of respondent WTP. The purpose of including a Tobit analysis is that it is based on the idea that one cannot get negative bids in responses to WTP questions and thus the method is a more accurate reflection of the survey results. However, the above studies have shown that when few zero bids are recorded, both methods give similar results. The number of zero bids recorded in this study is relatively low and as a result only the OLS regression estimation technique has been used. WTP was first regressed against a full compliment of explanatory variables for each sample group to provide a full specification of the WTP model. From this specification a stepwise regression technique was used to estimate the best fitting model, both the full and best fit specifications are included in table 8f below. The figures in brackets are t-statistics for each explanatory variable coefficient and adjusted r-squared figures are shown at the end of each model.

Table 5g: **Regression Results¹** for the three population samples analysed in the study.

| Model Specification | Full Local Specification | Local Best Fit | Full Domestic Tourist Specification | Domestic Tourist Best Fit | Full Foreign Tourist Specification | Foreign Tourist Best Fit |
|---------------------------------|----------------------------------|---------------------------------|-------------------------------------|--------------------------------|------------------------------------|-----------------------------------|
| Variable | Coefficient (t-statistic) | Coefficient (t-statistic) | Coefficient (t-statistic) | Coefficient (t-statistic) | Coefficient (t-statistic) | Coefficient (t-statistic) |
| C | -5.48807*** (-3.29766) | -4.6258*** (-4.05146) | -11.86883 (-1.667236) | -10.8254** (-2.1975) | 0.224515 (0.062185) | 3.064312 (1.213139) |
| LOG(INCOME) | 1.03332*** (8.30419) | 1.0646*** (9.04078) | 0.959533 (1.128407) | 1.161497* (1.7795) | 0.873187*** (3.855130) | 0.730680*** (4.214977) |
| LOG(AGE) | 0.204358 (0.48080) | -- | 0.824166 (0.676552) | -- | -1.62678*** (-2.970606) | -2.02587*** (-6.586314) |
| LOG(EDUCATION) | 0.338857** (2.19684) | 0.45923* (1.80382) | -0.024014 (-0.033122) | -- | 0.254089 (1.099633) | 0.356526* (1.854754) |
| MARSTAT (Dummy1) | -0.362215 (-1.39247) | -0.4164* (-1.75698) | 0.56465 (0.633244) | 1.04583* (1.9205) | -0.221167 (-0.725658) | -- |
| LOG(HHSIZE) | -0.225353 (-1.09600) | -0.206543 (-1.07170) | 0.113358 (0.190332) | -- | -0.233787 (-1.179050) | -0.30882*** (-2.276509) |
| SEX (Dummy2) | 0.158484 (0.62791) | -- | -0.277369 (-0.534577) | -- | 0.151125 (0.750376) | -- |
| LOG(QUAL)/ QUAL ² | 0.456726 (0.79376) | 0.457273 (0.87691) | 1.653426 (1.247033) | 1.854307 (1.669873) | -0.100096 (-0.400400) | -- |
| LOG(ENVATT) | -0.067533 (-0.37205) | -- | 0.281715 (0.442403) | -- | 0.034861 (0.234106) | -- |
| ACTPREF (Dummy3) | -0.108308 (-0.40215) | -- | -0.756161 (-1.272084) | -0.70725 (-1.6655) | 0.228205 (1.147203) | 0.220302 (1.223098) |
| PROVINCE (Dummy4) | -- | -- | 1.779654** (2.38275) | 1.87797*** (3.42078) | -- | -- |
| NATION(Dummy5) | -- | -- | -- | -- | -0.089543 (-0.419712) | -- |
| Adjusted R-squared | 0.783156 | 0.795956 | 0.615536 | 0.679143 | 0.827731 | 0.850555 |
| F-statistic | 15.84770 | 29.86666 | 5.642963 | 13.27658 | 15.41464 | 35.14864 |
| n | 41 | 41 | 31 | 31 | 31 | 31 |
| *** p>0.01 | ** p>0.05 | * p>0.1 | | | | |

¹ Results obtained using Eviews statistical package

² For the foreign tourist sample quality was included as a dummy variable (see chapter 5)

5.2.7.1 Interpretation Of The Resultant Bid Functions

The first aspect of the models to note is the presence of relatively high adjusted r-squared figures with relatively few significant explanatory variables. This immediately points to the presence of multicollinearity which essentially occurs when a set of explanatory variables are strongly related in their effect on the dependent variable. Covariance matrices were calculated for WTP and explanatory variables used in the full specification of the three models to further probe the effects of multicollinearity. The covariance results are presented in Appendix 3 and suggest that although there is covariance amongst some variables, severe multicollinearity is not present.

The constant terms in both the full and best-fit specifications of the local Plettenberg Bay models were negative and significant at the 99% confidence level. Statistical theory would suggest that this is the result of some explanatory variable being omitted from the model; it could also point to the effects of purchasing moral satisfaction on the bid function (Khaneman & Knetsch, 1992), (Horton *et al*, 2001). Payment motivation results presented in section 5.2.2 above suggest, however, that although 'warm glow' effects are present they are acceptably low. In light of this, an alternative explanation for the significance of the constant term is that the respondents in the local Plettenberg Bay sample experienced a high degree of uncertainty in stating their WTP for the Bay Management Program, which would be consistent with results from other similar studies (Schkade & Payne, 1994) (Horton *et al*, 2000). This explanation is made more plausible by the fact that foreign tourist respondents showed a higher degree of certainty (section 5.2.2 shows that 39% of this sample stated that their WTP was the amount that they would expect to pay for an environmental good of this nature) and the constant terms in this model specification are shown not to be significant. In support of this explanation the constant term in the best fitting domestic tourist model is significant at a 95% confidence level, suggesting some uncertainty. However, this is not as pronounced as in the Plettenberg Bay local model but is lower than the certainty experienced by foreign tourists (section 5.2.2 shows that 18% of the domestic tourist sample stated that their bid was the amount that they would expect to pay for an environmental good of this nature).

Income has a strong positive effect on stated WTP across all but the domestic tourist full specification model. This significance is to be expected as higher income individuals tend to

have more disposable income at the end of the day to spend on environmental goods and services such as the Bay Management Program.

Age proved not to be a significant explanatory variable in the local Plettenberg Bay model specifications. It did, however, show a significant (99% confidence level) negative relationship with regard to WTP in the foreign tourist model specifications. The negative coefficient of the age variable suggests that in the case of foreign tourists older respondents have a lower stated WTP than younger foreign tourists. This result could be seen as counter-intuitive in that older individuals tend to have higher incomes than younger individuals and as a result, older individuals tend to have more money available to spend on all goods and services including environmental goods.

This could be interpreted through the savings life-cycle hypothesis alluded to in chapter 5: older foreign tourists may find themselves at a point in their lives where they begin to enter the dis-saving phase of the savings life-cycle, and as a result may well have less disposable income to spend on environmental goods and services such as the Bay Management Programme. Alternatively this negative relationship may occur because older respondents believe that they have less time to benefit from their outlay on maintaining (or improving) the environmental quality of Plettenberg Bay (Sikhakhane, 2001). However, looking again at payment motivation responses in section 5.2.2 a large proportion of the foreign tourist sample stated their motivation for contributing towards the Bay Management Program was either to improve the environment for future generations (39%) or that they would like to visit the site in the future (19%). This strong indication of bequest (non-use) value and future option (use) value suggest that foreign tourists do not believe that they would not benefit from their outlays in the future. This tends to rule out the above explanation for the negative relationship between stated WTP and age, but leaves this result unsatisfactorily explained.

Respondent education has a significant (90% confidence level) and positive relationship with stated WTP across the local Plettenberg Bay and foreign tourist best-fit model specifications. This is in line with theoretical predictions in that as education levels rise, knowledge and understanding of one's environment also tends to increase.

Marital status was introduced as a dummy variable ($m=1$; $s=0$) and showed a significant negative relationship with respect to WTP in the local Plettenberg Bay best fit model

specification (at the 90% confidence level). Household size yielded a negative and highly significant (at the 99% confidence level) relationship with respect to WTP in the foreign tourist best fit model specification. The trend gained from the marital status and household size indicators for foreign tourists and for the local Plettenberg Bay population suggests that single people with fewer dependants (smaller household size) are more likely to state higher WTP bids. Although marital status and household size were not significant across both best-fit specifications, their respective signs still support this trend. An explanation for this trend is that single individuals with fewer dependants do not have the same household budget constraints that married individuals with many dependants have. As a result such individuals have more disposable income to spend environmental goods such as the Bay Management Program, hence their higher stated WTP.

It could however be argued that the occurrence of bequest and future option value (particularly significant in the foreign tourist sample) means that respondents with partners and dependants (to enjoy the Bay with in the future and to leave behind as a legacy for future generations) would be expected to have higher WTP bids. There may well be grounds to this hypothesis, and the significance (at a 90% confidence level) of the positive relationship between WTP and marital status in the best-fit domestic tourist model supports this idea. However, to confirm this full relationship it would be necessary to test whether or not bequest and future option value increase as the number of dependants increases: would it be reasonable to assume that because one individual has more dependants than another, that individual derives more bequest and future option value from preserving the environment than the other simply because they have more dependants with whom to enjoy it?

The remaining explanatory variables included in the model failed to show any significance: Although not significant, the negative relationship between environmental attitude and WTP in the local Plettenberg Bay full model specification does pose some concern as this suggests the counter-intuitive conclusion that individuals who are more 'pro' environmental issues state lower WTP figures than those who are less concerned about environmental issues.

The perceived Bay quality dummy variable in the foreign tourist model specification yielded a negative relationship with respect to WTP. This implies that those foreign tourists with a higher stated perception of the Bay's quality are more likely to state lower WTP figures. This result could signify that foreign tourists who perceive the Bay to be in good condition do not feel as pressing a need to contribute to its up keeping as those who see the Bay in a less pristine state.

Finally, the gender and activity preference dummy variables included in the model failed to provide any conclusive insight into the WTP characteristics of the samples. The same was true of the nationality dummy variable introduced to test whether there was a significant difference in stated WTP between tourists from the United Kingdom and tourists from elsewhere in the world.

5.2.8 Aggregation of WTP Estimates

Tables 5c, 5d and 5e yield WTP estimates of R175.08 per annum for the local Plettenberg Bay sample and R5.97 and R22.40 per day for the domestic tourist and foreign tourist samples respectively. In order for these results to provide useful information regarding the value of the Bay to these population groups, the WTP figures must be aggregated across the populations sampled. As mentioned in chapter two the aggregation of WTP estimates may pose problems that can lead to highly implausible results. The question that needs to be addressed is: What population must the WTP estimates be aggregated to? Estimates applied to the national population would result in inconceivably large annual WTP aggregations, thus for the purpose of this study the population of those who live in proximity to the Bay have been used along with the population of those who visit the Bay: According to Municipal figures, there are 8792 formal households in the Greater Plettenberg Bay Municipality, aggregating the Plettenberg Bay sample WTP figure to this household population yields a total WTP value of R1 539 300 per annum for the local Plettenberg Bay population. Chapter 1 highlights that exact tourist population sizes are difficult to arrive at, however the annual number of domestic tourists to Plettenberg Bay has been estimated to be between 455 000 – 617 000 tourists and survey data indicates that the average domestic tourist household size is approximately 2.61 people per household. Combining this data table 5h yields an estimate of 174 330 – 236 590 domestic tourist households visiting the Bay per annum and aggregating the annual WTP figure of R32.35 to this number of households yields a total value of between R 5 639 600 – R7 653 700. The number of foreign tourists to Plettenberg Bay per annum has been estimated at between 245 000 – 332 000 and the average household size is approximately 1.65 people per household. Combining this data with an average annual WTP of R55.35 yields an aggregated value of between R 8 219 000 – R 11 137 500. The combination of the passive use value placed on Plettenberg Bay by the three population groups yields a total passive use value of between R15 397 900 – R20 330 500 as shown in table 5h below:

Table 5h: Aggregated WTP for Bay Management Plan by population groups sampled

| | Local Plettenberg Bay population | Domestic Tourist population | Foreign Tourist population | Total |
|-------------------------------------|----------------------------------|-----------------------------|----------------------------|-------------------------|
| Average Annual WTP ¹ (R) | 175.08 | 32.35 | 55.35 | |
| Average Household size | -- | 2.61 | 1.65 | |
| No. of Households ² | 8792 | 174 330– 236 590 | 148 490 – 201 220 | |
| Aggregated WTP (R) | 1 539 300 | 5 639 600 - 7 653 700 | 8 219 000 – 11 137 500 | 15 397 900 – 20 330 500 |

¹ Annual WTP calculated by multiplying the local Plettenberg Bay population's average monthly WTP by 12 and the average domestic and foreign tourist WTP bids by the average number of days spent on site.

² In the case of domestic and foreign tourists, the number of households was calculated by dividing the number of tourists annually by the average household size reported in the survey

5.3 CONCLUSIONS – THE USEFULNESS OF THE BAY VALUATION RESULTS

The results presented in this chapter lead to a number of important conclusions: First, they show that although contingent valuation surveys are susceptible to distortions associated with strategic, free rider and warm glow biases, careful survey design and adherence to the NOAA's set of guidelines leads to such effects occurring at acceptably low levels. The implication of this result is that it is indeed possible to arrive at plausible estimates of the passive use value of environmental goods such as Plettenberg Bay. In addition to this an analysis of consumer behaviour with regard to Plettenberg Bay as an environmental good has shown that respondent bid behaviour (WTP) exhibits both a negative relationship with price and decreasing marginal utility characteristics leaving the survey results internally consistent.

Having satisfied the requirement of internal consistency the results show that the Bay as a coastal asset has indeed been undervalued in the past in terms of what the general public is willing to contribute toward its management. This additional value stems from the passive-use component of the total economic value of the Bay with future use and bequest value dominating this aspect of additional value. The passive-use value of Plettenberg Bay has been shown not only to be present but significant in terms of the overall value of the Bay. Importantly, the WTP models used to analyse the determinants of WTP for the three populations sampled show that different user groups exhibit different characteristics in terms of their WTP for the proposed Bay Management Plan.

The above results place an additional annual value on the Bay of between R 15 397 900 – R20 330 500. Considering that tourism alone contributes approximately R200 million to the Plettenberg Bay Economy per year (Becke, 2003), this additional value per annum seems plausible if not conservative. This is a component of the Bay's value that has not been recognised in policy formation to date, it is however of utmost importance that it is included in future policy decision making. These WTP estimates can be seen by policy makers as the nucleus of the Bay's value, a value that provides for and facilitates the value adding recreational (tourism) activities that the Bay supports and which contribute to the R200 million tourism industry. When seen from this perspective the WTP figures highlight the importance of maintaining the income generating capabilities of the Bay. In other words the nuclear value of the Bay must be maintained (through a Bay Management Programme) to ensure that the value adding activities currently occurring can do so effectively in the future. The obvious progression of this analysis would thus be to recommend the implementation of a Bay Management Plan to ensure the maintenance of the nuclear value of the Bay. This recommendation would be of limited use and indeed incomplete without a note on how to implement such a Management Plan. While this study cannot provide insight into the biological regulations that such a management plan would entail, it can provide guidance with regard to the practicalities involved in the financing of such a Management Plan. Chapter six follows with a discussion of the practicalities involved in capturing the additional value that has been calculated with the results arrived at in this study.

CHAPTER 6: ENVIRONMENTAL SURCHARGE POLICY RECOMMENDATIONS AND CONCLUSIONS

6.1 A BAY MANAGEMENT PLAN – PLETTENBERG BAY ‘MARINE PARK’

The occurrence of public preference for the provision of environmental services in the Plettenberg Bay municipal jurisdiction and the extent of this preference points to the need to modify the mix of public goods and services currently being provided. The obvious modification would be to include a Bay Management Plan to the register of publicly provided services and in light of this a proposal for the introduction of a ‘Marine Park’ is currently being submitted to the Municipal Council. This thesis provides the economic rationale required for its introduction and this chapter provides a guide in terms of the financing of such a project.

6.2 THE FINANCING OF THE MARINE PARK SERVICE

As with local government provision of all public services, an idea of the costs that will be reasonably incurred by the municipality in providing the services is needed as a starting point. To this end a budget for the Bay Management Plan has been developed in collaboration with the head of Western Cape Nature Conservation in the Plettenberg Bay area (Nieuwoudt, 2003). This has been done by adapting the current budget allotted to the management of the Robberg Reserve to the area that the Marine Park will cover. The budget (included as appendix 4 to this document) includes an annual administrative budget as well as a capital expenditure budget:

Table 6a: Proposed Marine Park Budget Summary¹

| Budget Breakdown | Rand |
|------------------------------|-----------|
| Annual Administration Budget | 740 000 |
| Capital Expenditure Budget | 600 000 |
| Total Start-up Budget | 1 340 000 |

¹ A full breakdown of the budget can be found in appendix 4

The distinction made between the administrative and capital expenditure budgets can be related to the difference between core and project funding alluded to in the discussion of

Local Coastal Fora (LCF) in chapter two (McGlashan, 2003). The similarity lies in the fact that the administration budget will have to be met using core funding which is less attractive to potential sponsors in terms of publicity and corporate social investment potential. The capital budget, however, consists mainly of the vehicles and vessels required to carry out the management policy directives. These aspects of the budget have more potential to be matched with financing from the business community (the sponsorship of a vehicle by a motor car company for example). In the context of coastal management financing, over the past two years the ORCA Foundation has done well in approaching individuals and businesses throughout the country for sponsorship. The ORCA Foundation has, for example, financed a number of research projects (including this economic analysis) and has organized sponsorship to finance the 'ORCA' education centre and research and education vessel. In light of this it is recommended that

1. A private fund raising initiative commences at the same time as the introduction of the Marine Park initiative.
2. The ORCA Foundation should spear head a capital budget fund raising initiative, successful completion of which would significantly reduce the amount of funding required to run the Marine Park annually.

Armed with the Marine Park budget, it is now necessary to consider the question of how the balance of the financing required is to be raised:

6.2.1 Towards an Environmental Surcharge

The results presented in chapter five show that the public not only has a preference for the inclusion of a Bay Management Plan in the mix of public services offered by the Municipality, but that this preference is significant. The passive use value that the public derives from the Bay can be seen as an indication of the extent of this preference. This aspect of the Bay's value has yet to be formally acknowledged in policy regarding the Bay's management. As such this value provides the economic justification that the Municipality requires to introduce the surcharge (should any further justification be needed in light of the community's reliance on the Bay as a means of earning a living and indeed their willingness to pay for such as service).

The benefit approach to the collection of public finances provides a starting point for the development of such an environmental surcharge. The approach is based on the idea that those who benefit from the provision of a service should be charged for its provision in relation to the benefits they receive (Black *et al*, 2000). Those who will benefit from the Bay Management Plan are obviously those who currently derive utility from the Bay being maintained in its current state. The user groups analysed in this study have been reasonably assumed to derive non-use (passive use) value from the Bay in addition to direct use value. As a result these three user groups namely local residents, domestic tourists and foreign tourists should bear the cost of the service provision through a user surcharge.

The next step in the process involves deciding upon how to introduce such a user surcharge. An access fee, as charged by parks such as the Robberg Reserve would be the simplest solution to the problem, however, short of placing tollgates at the entrances to the town there is no practical way of implementing such an access fee. In light of this the following solutions are recommended:

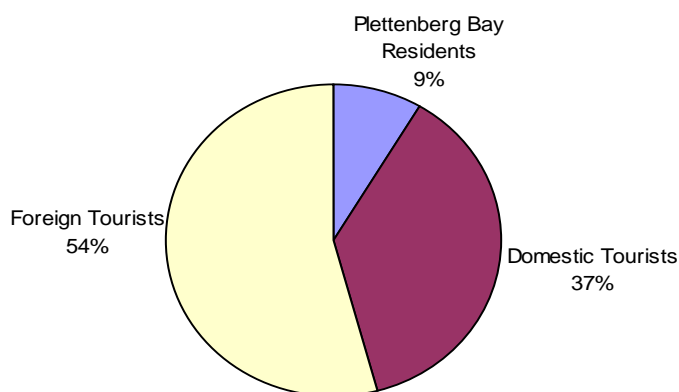
1. A Bay Management surcharge should be levied on local residents through the current process of rates paid on property.
2. To capture the value placed on the Bay by tourists, a Bay Management surcharge be levied through the accommodation frequented by tourists during their stay in Plettenberg Bay.

Before discussing the practicalities involved in the introduction of such environmental surcharges, it is important to note that interest in user charges is growing amongst the governments of many countries. This interest stems from the distinction between user charges and taxes. A tax can be defined as “a compulsory payment to the government without any *quid pro quo*” (Black *et al*, 2000:210). In essence a tax is paid to the government and joins a general fund from which all public services are financed. There is no direct link between a tax paid and the service provided using that tax as a source of funds. User charges, however, create a direct link between being charged for and provided with a service. For example the access fee charged on entrance to the Robberg Reserve is used to finance the upkeep of the reserve. The same principle can be applied to the proposed Marine Park, and the decentralized administration of levies on property and accommodation would ensure that the link is maintained between the benefits received and costs borne in the provision of the Marine Park service.

6.2.1.1 Setting the Bay Management surcharge

Chapter five provides quantitative guidance for the setting of the various surcharges proposed above. The overall proportion of the total passive use value placed on the Bay by each of the population groups sampled is shown in graph 6a below

Graph 6a: Proportion of the total passive use value placed on Plettenberg Bay by the populations sampled



Graph 6a above shows the proportion of the total passive use value placed on Plettenberg Bay by the populations analyzed. Intuitively, the cost of managing the Bay should be set according to these proportions, as this value represents the benefits received by each population group over and above what they currently pay to ‘consume’ the recreational experience. With this in mind, local residents should contribute toward 9% of the management funds required and domestic and foreign tourists should contribute toward 37% and 54% of the funds needed respectively. This proportional breakdown of the responsibility for the cost of providing the Bay Management service, along with the actual cost of providing the service provides a base from which the surcharges can be set.

Table 6b: Summary of contributions required from each population group to finance Bay Management Plan

| Population Group | Proportion of funds required | Administration Budget (R) | Capital Expenditure Budget (R) ¹ | Total |
|-------------------|------------------------------|---------------------------|---|------------------|
| Residents | 9% | 66 600 | 54 000 | 120 600 |
| Domestic Tourists | 37% | 273 800 | 222 000 | 495 800 |
| Foreign Tourists | 54% | 399 600 | 324 000 | 723 600 |
| TOTAL | | 740 000 | 600 000 | 1 340 000 |

¹ The annual administration and capital expenditure budgets have been treated separately because of the possibility that the capital expenditure budget may be ‘matched’ by potential sponsors of capital equipment. In the event that it is not the capital budget (or parts of it) may be added to the treatment of the administration budget

Table 6b above summarizes the contributions required by each population group in order to finance the Bay Management Plan budget developed above, using the proportions arrived at through the survey. In light of this, residents would contribute R66 600 per annum to finance the administration budget and in total R54 000 to finance the capital expenditure budget. Similarly domestic and foreign tourists would contribute R273 800 and R399 600 respectively to finance the administration budget and a further R222 000 and R324 000 respectively to finance the capital expenditure budget.

6.2.1.2 Treatment of local residents

It is proposed that residents contribute to the Bay Management Plan through rates paid on property. The mechanism at work here introduces the progressive surcharge discussed in section 2.2.2 of chapter two. The owner of a property of average value would pay the amount that when varied across the property value distribution collects the R120 600 required to finance the residents share of the cost of the Bay Management Plan. Applying the above surcharge mechanism to the schedule of rateable property values in Plettenberg Bay yields the following results:

1. To finance the R120 600 contribution to the budget an annual charge of 0.00006% of property value in the Plettenberg Bay Municipal jurisdiction will need to be charged. This means that a property valued at R200 186 (the average value of rateable land according to the Municipal schedule of property values) will be charged an additional R1 per month to make the Marine Park a sustainable reality.
2. When compared to the average monthly willingness to pay figure of R15 by local residents reported in the survey the R1 per month needed to finance the budget seems a more than reasonable figure to charge for the service provided. It also provides scope for budget revision in the future should it be deemed necessary.

6.2.1.3 Treatment of domestic and foreign tourists

It has been recommended that a Bay management surcharge be charged to domestic and foreign tourists based on the accommodation that they stay at whilst in Plettenberg Bay. Ideally, to promote vertical and horizontal equity, a charge structure similar to the residential property value surcharge should be applied to both categories of tourists. The surcharge should be based on the rate that each individual commercial property charges tourists for its

accommodation. However, a schedule of accommodation rates in Plettenberg Bay is not available nor is it likely to be a viable option due to the continuous fluctuation in accommodation rates. In light of this, the tourist populations' contribution to the Bay management plan would be best collected through a rate charged to owners of property offering 'commercial' (tourist) accommodation. An indication of the extent of this surcharge is given below according to the estimated number of tourists to Plettenberg Bay annually in conjunction with the average number of days spent in Plettenberg Bay reported in the survey:

Table 6c: Required contributions of domestic and foreign tourists to finance Bay management.

| Tourist Group | No. of tourist households annually | Average days spent in Plettenberg Bay | Daily accommodation surcharge (R) | Total Contribution to fund |
|-------------------|------------------------------------|---------------------------------------|-----------------------------------|----------------------------|
| Domestic Tourists | 205 460 | 5.42 | 0.445 | 495 800 |
| Foreign Tourists | 174 855 | 2.47 | 1.68 | 723 600 |
| TOTAL | | | | 1 219 400 |

Table 6c above provides an indication of the amount that would be have to be charged to domestic and foreign tourists per day to finance the proposed budget. The figures are again well below the WTP estimates arrived at in the survey used in this study. To finance the domestic tourist share of the budget, a daily surcharge of approximately 50 cents would be required. Similarly, the foreign tourist contribution would require a daily surcharge of approximately R1.70.

The surcharge would be progressive and yield the same benefits as the surcharge on residents yields in that it would be distributive and vertically and horizontally equitable. It will however require that a distinction be made between 'commercial' and private accommodation in Plettenberg Bay. Without a schedule of values for 'commercial' accommodation providing properties in Plettenberg Bay, it is not possible to provide a quantitative analysis of the rate required to finance the tourist contribution to the budget. However the treatment of the rate charged to residents provides the framework that should be applied to quantify this commercial property rate.

In light of the resistance that may be encountered by the introduction of this commercial accommodation property rate, those who oppose the rate should be made aware of the following two points:

1. Economically rational accommodation providing agents will transfer the additional cost of owning a commercial property in Plettenberg Bay to the tourists frequenting their accommodation by increasing their accommodation rates by an amount equal to the commercial surcharge that they have to pay. In fact, armed with the information gathered in this study accommodation providers could make additional profit by increasing their rates by an amount larger than the increase rates that they pay: This leads to the second point which must be emphasized to those who oppose the commercial surcharge:
2. As figure 3d (chapter 3) illustrates, consumer surplus is essentially the amount that a consumer (in this scenario a tourist) is willing to pay for a good (in this case accommodation) over and above what they actually have to pay (the market price for accommodation). The introduction of a surcharge closes the gap between what a tourist is willing to pay for accommodation and what they actually have to pay, and in the process transfers the surplus utility from the consumer to the producer (in this case from the tourist to the accommodation provider and indirectly to the municipality). The practical implication of this surplus transfer is that provided the surcharge does not exceed the average willingness to pay figures arrived at in chapter five (approximately R6 per day and R22 per day for domestic and foreign tourists respectively), the surcharge will not lead to a decrease in the demand for accommodation in Plettenberg Bay by tourists. As table 6c reports, the daily figures required to finance the budget are far from these margins in both the domestic and foreign tourist cases.

As Dales (1968) notes, a certain level of experimentation may be required in the long run to arrive at a surcharge that is efficient on a practical level (to absorb any additional costs in administering the new surcharge for example). The commercial property rate is a long-term solution to the budget financing challenge and may take more time to implement than the standard residential rate. In light of this it may be necessary to transfer more of the cost of provision onto residents initially and in time implement the commercial surcharge. To put

this idea into context if the cost of the full budget were to be transferred to residents, the average valued property in Plettenberg Bay would contribute a monthly figure of R10.34, a figure that is still less than the average willingness to pay for the service reported in chapter five of approximately R15 per month. As a result there is space to modify and adjust the surcharge as it is implemented.

6.3 CONCLUSION

This thesis has examined the feasibility of the introduction of environmental surcharges to finance local coastal management initiatives. Plettenberg Bay has provided a case study through which the practicalities of the implementation of such surcharges have been explored.

In chapter one the nature of Plettenberg Bay as a coastal asset has been highlighted in terms of the local economy's reliance on the Bay to support and develop the tourism industry. The pristine environmental quality of the Bay has also led to the development of a dynamic property development industry. Both of these factors point to the need to maintain the quality of the Bay. Doing so will facilitate continued growth in the tourism industry (with positive social and economic development spill-overs) and provide those who have invested in property in the area with some assurance as to the security of their investment.

The first question posed in this thesis has concerned whether or not it is possible to introduce a local environmental surcharge within current formal institutional arrangements: Chapter two has shown that the White Paper for Sustainable Coastal Development (RSA, 2000) proposes the decentralization of responsibility for and authority to manage coastal resources. This strategy has the potential to develop a coastal management style that is capable of adapting to ever-changing local coastal conditions. The decentralization of fiscal authority is also expected to result in local governments providing the mix of environmental public services that local communities desire.

The primary argument against this trend in decentralization is that costs borne (or benefits received) by members of one community may flow across jurisdictions to other communities, and in the process distort the link between costs borne and benefits received in the provision of public services. If extensive, these spatial externalities have the potential to cancel out the allocative efficiency benefits that fiscal decentralization has to offer. Chapter two has shown

that the spatial externality effects of the introduction of a Bay Management Plan in Plettenberg Bay are likely to be minimal. This is due to the sedentary nature of the majority of the coastal and environmental resources in the area and because of Plettenberg Bay's location between two established marine reserves. However, central responsibility for the management of migratory species such as whales and dolphins is recommended due to the negative spatial externalities that would develop if such resources were managed on a local scale.

The dynamic effects of the introduction of a local environmental surcharge have also been examined. The public has the choice to either contribute toward the surcharge and enjoy the benefits that Plettenberg Bay has to offer, or 'vote with their feet' (Tiebout, 1956) and frequent other areas of the coast that have not implemented environmental surcharges. This fiscal decentralization phenomenon is of particular relevance to the tourist public visiting Plettenberg Bay, as such individuals are highly mobile. If the surcharge were set too high, tourists may choose to go elsewhere along the coast, which would have a negative effect on the tourism industry. Conversely, the provision of a Bay Management service may provide both residents and tourists with a mix of public services that has not been available to them before and in doing so satisfy their preferences more effectively.

To fully examine the possibility of introducing a local environmental surcharge it has been necessary to question whether the new participatory style of coastal co-management [RSA, (2000); Glavovic, (2000)] provides the informal institutional arrangement necessary for successful management of South Africa's coastal assets: Again chapter two has shown that provided a number of co-management conditions are met, the style will have its desired effect. Most notably in the context of Plettenberg Bay is the development of a Bay Management Forum to include all local stakeholders in the decision-making process, and provide a pool of experience and knowledge as an input into this process. In addition to this, a stable source of long term funding to finance Bay Management initiatives is vital to ensure the continued effectiveness of coastal co-management.

The question regarding a source for coastal management financing thus brought this thesis to a final question: Given that an environmental surcharge would provide a source of stable finance, would the public be willing to pay such a surcharge? Following on from this, if they are prepared to pay, how much would they be prepared to contribute toward the surcharge?

Chapters four and five of this thesis have thus focused on analyzing the public's preference toward the provision of public environmental services within the Plettenberg Bay Municipal jurisdiction. Chapter four has described the development of a survey used to investigate the public's preference toward the provision of environmental services by probing their willingness to pay (WTP) for a Bay Management Plan. Chapter five has presented and discussed the results gained from this survey: The average WTP for a Bay Management Plan by residents has been estimated at R15 per month, while domestic and foreign tourists are WTP a daily rate of R6 and R22 respectively. Aggregating these figures across their respective household populations yields a total annual passive use value of between R15 397 900 – R20 330 500. This passive use value reflects the extent of public preference for environmental services in Plettenberg Bay, and this value provides the guidance needed to set an effective environmental surcharge.

The recommendations in this chapter have been based on the fact that the public has a strong preference for the provision of environmental services in Plettenberg Bay, in the form of a Bay Management Plan. The proposed Marine Park would fulfil these needs and preferences. It has been proposed that the local government (Municipality) in conjunction with the community (represented by a Bay Management Forum) would be charged with the provision of the service.

The costs of providing the service would be transferred to those who derive benefit from the Bay's quality being maintained. This includes local residents and domestic and foreign tourists. The distribution of the costs of provision would be based on the extent of the benefits received by each population group. An indication of which is the passive use value placed on the Bay by each group. Collection of the revenue needed to finance the budget should be carried out through two channels:

1. A residential environmental surcharge based on residential property value, set according to a progressive and distributive framework.
2. A commercial environmental surcharge based on commercial accommodation offering property in Plettenberg Bay set to collect the tourist contribution to the Bay management budget, employing the same progressive and distributive framework as above.

Finally, a certain degree of experimentation may be needed to ensure the practical efficiency of the surcharge structure described above (Dales, 1968). The significant difference between the amount required to finance the proposed budget and the public's willingness to pay for the provision of public environmental services in Plettenberg Bay will allow for budget modification and adaptation should it be deemed necessary.

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7. don't know
8. other

B3. (For those who answered no to question B1)

What are the main reasons that you think the Bay is not important?

1. Don't care about environmental issues
2. more important issues at hand
3. we can live without them
4. never heard about the Bay's environmental concerns before
5. don't know
6. other

B4. Do you think that the Bay and its marine resources are in any way under threat?

- | | | |
|------------|----------------|---------------|
| 1. Y | 2. N | 3. Don't Know |
| (go to B5) | (go to sect C) | (go to B5) |

B5. What do you think the main threats to the bay are?

1. commercial over-fishing
2. recreational over-fishing
3. motor vessel activities
4. illegal collection of marine resources (eg muscles & red bait)
5. over population of the area
6. water pollution (in the bay and estuary)
7. failure of marine legislation to be implemented and upheld
8. pressure from non-consumptive uses of the bay (eg whale & dolphin watching)
9. silting up of the estuary as a result of poor agricultural practices up stream
10. don't know
11. other

Section C – Contingent Valuation

Please listen carefully to the following information about Plettenberg Bay which is the area shown in the following map: **SHOW MAP 1**

Scenario – Bay Management Plan

Plettenberg Bay is well known for its scenic beauty and natural resource wealth. The marine environment is particularly attractive to fishermen both recreational and commercial as well as to more passive users such as whale watchers, kayakers and hikers.

Proposed Situation

The dark green border on this map highlights the boundary for a potential Managed Marine area.

(expand on the term for respondent):

any area of coastline which has been reserved by law to manage the enclosed environment in a sustainable way . Managed Marine areas are an effective way of brining all human activities in such areas under an integrated management plan to ensure that they do not destroy the basis of the ecosystem

This area contains reefs that have been designated as needing protection from over utilization and the constitutes a total of 40 square miles which is approximately 9 times larger than the current Robberg Reserve.

If the Management plan is implemented, managed use of the marine resources will lead to the biological quality of the bay being maintained and gradually improved thereby guaranteeing the livelihoods of those who depend on the Bay. The management plan will also improve the monitoring of and compliance to current coastal regulations and will provide additional job opportunities for implementing agents. If the management plan is not implemented biodiversity of the area (particularly the reefs) will be lost as it will not be possible to control the activities that are currently reducing the quality of the bay.

C1. How important do you think it is to introduce the Management plan that is outlined in the map you've just seen?

1 2 3 4 5 6 Don't Know

not important —————>very important

Local government has indicated that such a programme will have its blessing but because of the scale of the project finances for he scheme will probably not be forthcoming, as a result the funding would have to be raised through an additional nation-wide environmental tax on users of the area.

C2. Bearing in mind that payments would have to be made monthly to ensure the continued running of the programme and that this would reduce the amount of income you have for other household transactions, would you be in favour of paying this tax assuming that all the funds would be used directly for this programme? **(for domestic and foreign tourists the tax was posed as a daily levy on accommodation)**

1. Y 2. N 3. don't know
(go to C4) (go to C3) (go to C4)

C3. What is the main reason you would not be prepared to pay such a tax? **(not to be shown to respondent)**

1. can't afford it
2. taxes are too high already
3. the government should pay
4. the bay should be protected by law – one should not have to pay for such a service
5. the problems being experienced in Plettenberg Bay are not a priority
6. the problems being experienced in Plettenberg Bay are not important
7. I don't trust the Government
8. I need more information to answer the question
9. don't know
10. other

C4. What is the most important reason why you would be prepared to contribute towards a tax to implement this Management plan? **(not to be shown to respondent)**

8. it is a good cause
9. I would receive some personal benefit from paying
10. we should improve the environment for future generations
11. I want to be able to visit Plettenberg Bay in the future
12. I am concerned about loosing biodiversity in the Bay
13. my answer reflects my views on the need to preserve South Africa's entire coast line, not just this area of the coast
- other

C5. Can you now tell me the greatest amount of money that your household would be prepared to contribute to this tax to ensure that the Managed Marine area programme is successfully implemented? (please remember that this tax would reduce the amount of income you have to spend on other goods and services)

Consider the payment card with varying amounts of money:

Please look at each amount in the column with the currency which you feel most at home with and ask yourself if you would be willing to pay this amount to implement the Managed Marine area programme, or to not pay and keep things as they are at the moment.

Please don't agree to an amount if you believe that there are more important things to spend your income on and note also that you may change your payment decision at any time during the interview.

PAYMENT CARD 1

| <u>R</u> | <u>US\$</u> | <u>€</u> | <u>£</u> |
|------------|-------------|------------|-------------|
| 0 | 0 | 0 | 0 |
| 1 | 0.5 | 0.5 | 0.5 |
| 5 | 0.75 | 0.75 | 0.75 |
| 10 | 1 | 1 | 1 |
| 20 | 1.5 | 1.5 | 2 |
| 50 | 2 | 2 | 5 |
| 100 | 5 | 5 | 10 |
| 250 | 10 | 10 | 15 |
| 500 | 20 | 20 | 20 |
| 1000 | 50 | 50 | 40 |
| 1500 | 75 | 75 | 50 |
| 2000 | 100 | 100 | 75 |
| 5000 | 200 | 200 | 100 |
| Other..... | Other..... | Other..... | Other |

C6. Why have you chosen this amount as the most you're prepared to pay? (**not to be shown to respondent**)

1. it's the most I can afford
2. it's the most I'm prepared to spend on environmental issues
3. this is the amount I would expect to pay in taxes for environmental goods and services
4. it is a random choice
5. this would be enough if everyone paid the same amount
6. I can easily afford this amount
7. don't know
8. other

Section D – Socioeconomic and Travel Cost Model Indicators

1. Age
2. Sex: M F
3. Race: BLACK WHITE MIXED ORIGION
4. Home language: AFRIKAANS ENGLISH XHOSA OTHER
.....
5. Marital status M S D
6. Place of residence Country
7. Education

| | |
|----------------|-----------------|
| No schooling | Std 8 to Std 9 |
| Grade 0 | Std 10 – Matric |
| Grade 1 | Higher |
| Grade 2 | Other |
| Std 1 to Std 4 | Unspecified |
| Std 5 to Std 7 | |

8. Occupation:
 If unemployed: Reason:.....previous employment.....

 Searching for employment: Y N

9. Gross Monthly Income (R/ US\$ / €/ £)

| | | | |
|-------------|-----------------|-----------------|-----------------|
| 1 – 1500 | 6001 – 8000 | 14 001 – 16 000 | 22 001 – 24 000 |
| 1501 – 2500 | 8001 – 10 000 | 16001 – 18 000 | 24 000 – 26 000 |
| 2501 – 3500 | 10 001 – 12 000 | 18 001 – 20 000 | 26 001 – 28 000 |
| 3501 – 6000 | 12 001 – 14 000 | 20 001 – 22 000 | 28 000 – above |

+Any other sources of income?

How much per month? R = Gross household income

10. How many dependants are there in your household?
11. Have you been to Plettenberg Bay before? Y N
12. How often have you visited Plettenberg Bay in the last 12 months?
13. How long do you intend spending here :DAYSWEEKS
14. How long are you on holiday for.....DAYSWEEKS
15. Do you prefer: 1. Passive activities (eg beach walks, nature trails and whale watching)
 Or
 2. Active activities (eg kayaking and sky diving)

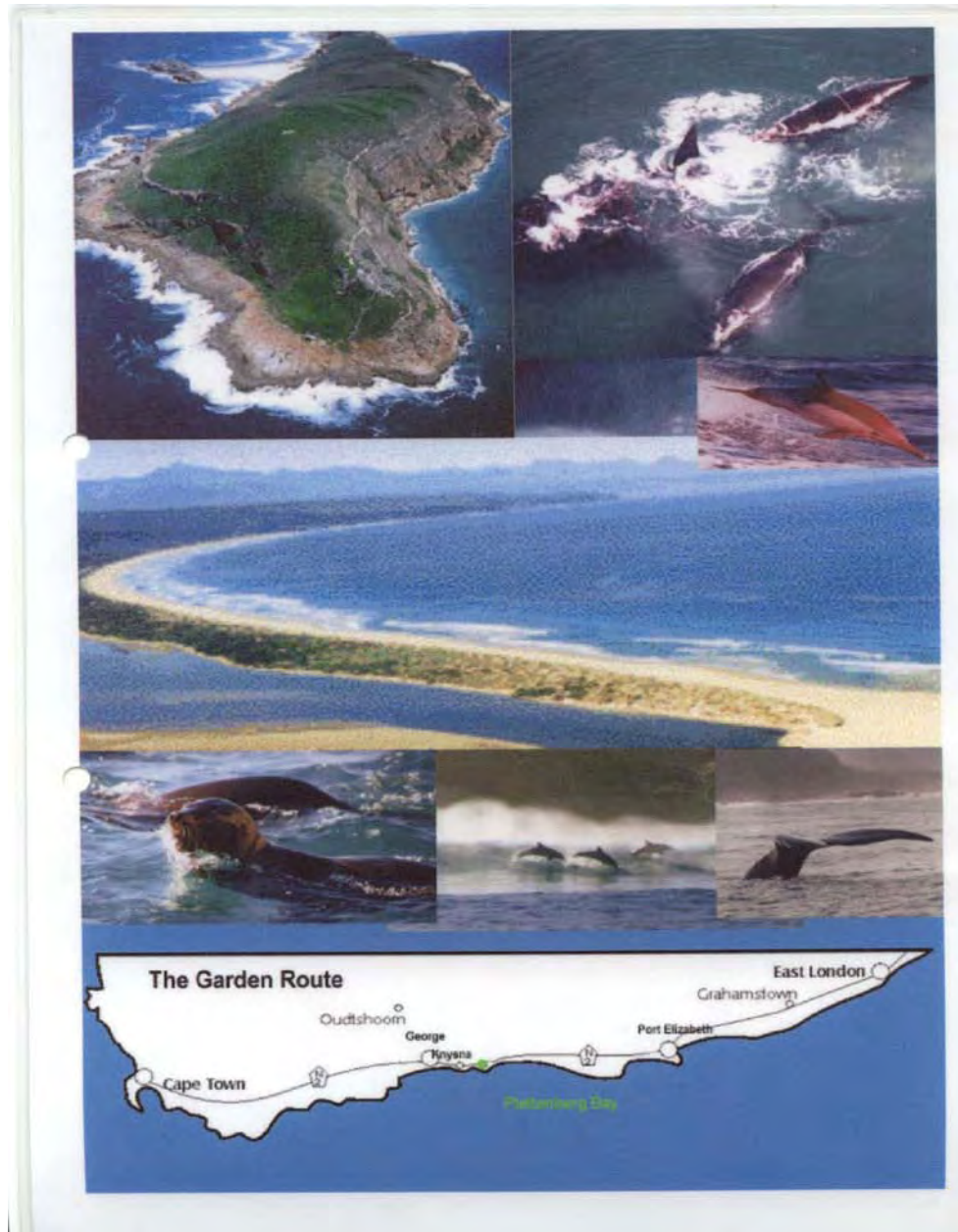
16a) **For SA residents:** How would you rate the environmental quality of Plettenberg Bay in comparison to other similar recreational areas you have visited (eg the Tsitsikama National Park, Sodwana Bay)

1. over-exploited 2. exploited 3. average 4. high 5. pristine 6. don't know

16b) **For non-residents:** Would you extend your stay in South Africa to stay longer in Plettenberg Bay?

Y N

APPENDIX 2: VISUAL AID USED IN PRESENTATION OF CV SCENARIO
(PICTURE 1)



Source : Ocean Blue Adventures Web Page (2003)

APPENDIX 3: COVARIANCE MATRICES FOR THE LOCAL PLETTENBERG BAY POPULATION, DOMESTIC AND FOREIGN TOURIST SAMPLES

| LOCAL PLETTENBERG BAY SAMPLE | WTP | WEEKLY INCOME | AGE | EDUCATION | MARITAL STATUS | HOUSE HOLD SIZE | SEX | BAY QUALITY | ENVIRONMENTAL ATTITUDE | ACTIVITY PREFERENCE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------------|---------------------|
| WTP | 1 | 0.621581 | -0.01333 | 0.432259 | -0.05759 | -0.29234 | -0.05691 | -0.05022 | 0.094374 | -0.19963 |
| WEEKLY INCOME | 0.621581 | 1 | 0.068913 | 0.491917 | -0.04484 | -0.28549 | -0.09771 | -0.30004 | 0.051484 | -0.02922 |
| AGE | -0.01333 | 0.068913 | 1 | -0.13301 | -0.50856 | 0.489921 | 0.135245 | 0.102911 | -0.17934 | 0.272534 |
| EDUCATION | 0.432259 | 0.491917 | -0.13301 | 1 | 0.272578 | -0.41669 | -0.20191 | -0.13376 | 0.231961 | -0.04041 |
| MARITAL STATUS | -0.05759 | -0.04484 | -0.50856 | 0.272578 | 1 | -0.63728 | -0.2673 | 0.164217 | 0.391575 | -0.23156 |
| HOUSE HOLD SIZE | -0.29234 | -0.28549 | 0.489921 | -0.41669 | -0.63728 | 1 | 0.318267 | 0.025679 | -0.33042 | 0.340618 |
| SEX | -0.05691 | -0.09771 | 0.135245 | -0.20191 | -0.2673 | 0.318267 | 1 | -0.1003 | -0.06826 | 0.590937 |
| BAY QUALITY | -0.05022 | -0.30004 | 0.102911 | -0.13376 | 0.164217 | 0.025679 | -0.1003 | 1 | 0.103344 | -0.01509 |
| ENVIRONMENTAL ATTITUDE | 0.094374 | 0.051484 | -0.17934 | 0.231961 | 0.391575 | -0.33042 | -0.06826 | 0.103344 | 1 | -0.18335 |
| ACTIVITY PREFERENCE | -0.19963 | -0.02922 | 0.272534 | -0.04041 | -0.23156 | 0.340618 | 0.590937 | -0.01509 | -0.18335 | 1 |

| FOREIGN TOURIST SAMPLE | WTP | GROSS MONTHLY INCOME | AGE | EDUCATION | MARITAL STATUS | HOUSE HOLD SIZE | SEX | BAY QUALITY | ACTIVITY PREFERENCE | NATIONALITY |
|------------------------|-----------------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------|-----------------|
| WTP | 1 | 0.692839 | -0.56206 | 0.35286 | -0.52942 | -0.26769 | -0.07514 | -0.57698 | 0.037959 | 0.436188 |
| GROSS MONTHLY INCOME | 0.692839 | 1 | -0.38908 | 0.501379 | -0.27705 | -0.25132 | -0.25703 | -0.42263 | -0.06516 | 0.481531 |
| AGE | -0.56206 | -0.38908 | 1 | -0.17786 | 0.589567 | 0.054976 | -0.15354 | 0.591446 | 0.429922 | -0.39512 |
| EDUCATION | 0.35286 | 0.501379 | -0.17786 | 1 | -0.17949 | -0.24366 | 0.053556 | -0.4442 | 0.044782 | 0.171924 |
| MARITAL STATUS | -0.52942 | -0.27705 | 0.589567 | -0.17949 | 1 | 0.481869 | 0.174135 | 0.656355 | 0.288055 | -0.29069 |
| HOUSE HOLD SIZE | -0.26769 | -0.25132 | 0.054976 | -0.24366 | 0.481869 | 1 | 0.057231 | 0.259584 | 0.011175 | -0.34442 |
| SEX | -0.07514 | -0.25703 | -0.15354 | 0.053556 | 0.174135 | 0.057231 | 1 | 0.127273 | -0.02485 | -0.17843 |
| BAY QUALITY | -0.57698 | -0.42263 | 0.591446 | -0.4442 | 0.656355 | 0.259584 | 0.127273 | 1 | 0.17893 | -0.36121 |
| ACTIVITY PREFERENCE | 0.037959 | -0.06516 | 0.429922 | 0.044782 | 0.288055 | 0.011175 | -0.02485 | 0.17893 | 1 | -0.01904 |
| NATIONALITY | 0.436188 | 0.481531 | -0.39512 | 0.171924 | -0.29069 | -0.34442 | -0.17843 | -0.36121 | -0.01904 | 1 |

| DOMESTIC TOURIST SAMPLE | WTP | ACTIVITY PREFERENCE | AGE | EDUCATION | ENVIRONMENTAL ATTITUDE | HOUSEHOLD SIZE | GROSS MONTHLY INCOME | MARITAL STATUS | PROVINCE | BAY QUALITY | SEX |
|----------------------------|-----------------|------------------------|-----------------|-----------------|---------------------------|-------------------|----------------------------|-------------------|-----------------|-----------------|-----------------|
| WTP | 1 | -0.03047 | 0.2793 | -0.05779 | 0.259945 | 0.472922 | 0.670235 | 0.417975 | 0.715855 | 0.321221 | -0.1367 |
| ACTIVITY PREFERENCE | -0.03047 | 1 | 0.540674 | -0.03742 | 0.06123 | 0.241846 | 0.1048 | 0.343427 | -0.04763 | 0.342875 | 0.321963 |
| AGE | 0.2793 | 0.540674 | 1 | 0.018339 | 0.043948 | 0.398242 | 0.371161 | 0.739862 | 0.145431 | 0.389945 | -0.13121 |
| EDUCATION | -0.05779 | -0.03742 | 0.018339 | 1 | 0.403939 | 0.331209 | 0.382714 | 0.305888 | -0.04243 | 0.086921 | -0.18736 |
| ENVIRONMENTAL ATTITUDE | 0.259945 | 0.06123 | 0.043948 | 0.403939 | 1 | 0.363301 | 0.377926 | 0.314043 | 0.436026 | 0.151693 | 0.06089 |
| HOUSE HOLD SIZE | 0.472922 | 0.241846 | 0.398242 | 0.331209 | 0.363301 | 1 | 0.75806 | 0.679861 | 0.290549 | 0.529151 | -0.10426 |
| GROSS MONTHLY INCOME | 0.670235 | 0.1048 | 0.371161 | 0.382714 | 0.377926 | 0.75806 | 1 | 0.600785 | 0.425731 | 0.546845 | -0.27923 |
| MARITAL STATUS | 0.417975 | 0.343427 | 0.739862 | 0.305888 | 0.314043 | 0.679861 | 0.600785 | 1 | 0.221703 | 0.371872 | -0.18421 |
| PROVINCE | 0.715855 | -0.04763 | 0.145431 | -0.04243 | 0.436026 | 0.290549 | 0.425731 | 0.221703 | 1 | -0.02326 | 0.113555 |
| BAY QUALITY | 0.321221 | 0.342875 | 0.389945 | 0.086921 | 0.151693 | 0.529151 | 0.546845 | 0.371872 | -0.02326 | 1 | -0.03773 |
| SEX | -0.1367 | 0.321963 | -0.13121 | -0.18736 | 0.06089 | -0.10426 | -0.27923 | -0.18421 | 0.113555 | -0.03773 | 1 |

APPENDIX 4: PROPOSED BUDGET FOR BAY MANAGEMENT PLAN

1. ANNUAL ADMINISTRATIVE BUDGET

| | | | |
|----------|-----------------------------------|-----------------------|-------------------|
| a | Personnel Costs | | |
| | Salaries | 1 Marine Park Manager | |
| | | 6 Marine Park Rangers | |
| | | 1 Clerical Assistant | |
| | | | 360,000.00 |
| | UIF | | 3,000.00 |
| | Overtime | | 30,500.00 |
| | Imcontive / Merit Bonus | | 15,000.00 |
| | TOTAL | | 408,500.00 |
| b | Administrative Expenditure | | |
| | Office rental | | 48,000.00 |
| | Transport(Vehicle Fuel) | | 60,000.00 |
| | Postnet and Post Box Rental | | 1,500.00 |
| | Cell phones | | 3,000.00 |
| | Telephones | | 15,000.00 |
| | Data Lines | | 2,000.00 |
| | Internet Service Provision | | 3,000.00 |
| | Courier Services | | 1,200.00 |
| | Radio Licence | | 2,000.00 |
| | Vehicle Licences | | 200.00 |
| | Advertisement and Promotions | | 3,000.00 |
| | Printing (signs and brochures) | | 6,000.00 |
| | Exhibition materials(eg stands) | | 4,000.00 |
| | Fuel: Boats | | 35,000.00 |
| | Oil | | 5,000.00 |
| | Tyres | | 1,600.00 |
| | Spares | | 3,000.00 |
| | Conference Costs | | 6,000.00 |
| | Subscriptions and Journals | | 300.00 |
| | Staff Refreshments | | 1,000.00 |
| | Photocopies | | 4,000.00 |
| | TOTAL | | 204,800.00 |
| c | Stores | | |
| | Ammunition | | 300.00 |
| | Batteries | | 1,000.00 |
| | Cleaning Materials | | 2,000.00 |
| | First Aid | | 500.00 |
| | Signage | | 4,000.00 |
| | Safety Equipment | | 1,500.00 |
| | Stationery | | 4,000.00 |
| | Consumable stores | | 3,800.00 |
| | Tools | | 2,000.00 |
| | Protective Clothing | | 2,000.00 |
| | Uniforms | | 9,600.00 |
| | TOTAL | | 30,700.00 |

| | | |
|----------|---|-------------------|
| d | Professional and Special Services | |
| | Accounting and Auditing fees | 4,000.00 |
| | Consulting Fees | 15,000.00 |
| | Security Services | 8,000.00 |
| | Cleaning Services | 9,000.00 |
| | Photographic - Films and Development | 500.00 |
| | Training (Course fees, Bursaries, Symposiums) | 5,000.00 |
| | Venue Hire | 2,000.00 |
| | TOTAL | 43,500.00 |
| | | |
| e | Repairs and Maintenance | |
| | Mechanical | 2,000.00 |
| | Computers | 2,000.00 |
| | Electrical | 2,000.00 |
| | Machinery | 4,000.00 |
| | Vehicles | 4,500.00 |
| | Boats | 6,000.00 |
| | S&T | 5,000.00 |
| | Electricity | 12,000.00 |
| | Municipal Services | 6,000.00 |
| | Sanitation | 3,000.00 |
| | Water | 6,000.00 |
| | TOTAL | 52,500.00 |
| <hr/> | | |
| | TOTAL ADMINISTRATION BUDGET | 740,000.00 |
| <hr/> | | |

2. CAPITAL EQUIPMENT BUDGET

| | | |
|----------|---|-------------------|
| a | Vehicles | |
| | Four wheel drive | 160,000.00 |
| | Two wheel drive | 100,000.00 |
| | | |
| b | Boats | |
| | 1 18ft butcat (with two 60hp engines) | 180,000.00 |
| | 1 4.5m semi rigid(with one 40hp engine) | 65,000.00 |
| | | |
| c | Office Equipment | |
| | Chairs, desks, PC, fax, copier | 60,000.00 |
| | | |
| d | Diving Equipment | |
| | 4 sets (complete) | 35,000.00 |
| <hr/> | | |
| | TOTAL CAPITAL BUDGET | 600,000.00 |
| <hr/> | | |

TOTAL BAY MANAGEMENT BUDGET

1 340 000