ASSESSING PUBLIC ATTITUDES AND BEHAVIOUR TOWARD TOURISM DEVELOPMENT IN BARBADOS: SOCIO-ECONOMIC AND ENVIRONMENTAL IMPLICATIONS

by

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This research discusses the negative social, environmental and economic impacts of tourism development in Barbados; describes the perceptions of residents and tourists to such; and measures their preferences for environmental management changes using the island’s lone marine reserve, the Folkestone Marine Reserve, as a case study. This research is underpinned by a number of policy and methodological objectives which were formulated with a view to better inform social decision-making about environmental management in the tourism industry in Barbados, and to better understand the factors associated with the successes or the pitfalls of tourism development. The research outcomes demonstrated that environmental management within the context of tourism development in Barbados requires the balancing of public needs with the environmental and economic consequences of development. As such, the results reinforced some of the theoretical and empirical revelations in the field of tourism and environmental management and further cemented the assertion that environmental management becomes onerous because of the presence of a number of innately complex and interlinked inferences: that preserving an environment that satisfies the divergent needs of users incurs both social and economic costs; that perceptions of tourism’s impacts are not mutually exclusive, which makes the issue of support for tourism development complex; that both the positive and negative impacts of tourism should be considered; that prudent environmental management is arguably the sine qua non for a viable tourism product; and that concerns remain as to whether the country can absorb the environmental and socio-economic shocks associated with tourism.

Keywords: Tourism development; environmental management; Contingent Valuation Method, Choice Modelling, Cluster Analysis
1.0 INTRODUCTION

1.1 The Impact of Tourism in the Caribbean

Tourism is one of the fastest growing economic sectors in the world. Though precise aggregate earnings are difficult to ascertain, the World Tourism Organisation (WTO, 2006) reported that in 2005 international tourist arrivals totalling 806 million were responsible for an estimated USD680 billion in tourism receipts. According to the World Tourism Organisation (WTO, 2006), there were 18.9 million tourist arrivals in the Caribbean in 2005, which accounted for USD20.4 billion in tourism receipts. Moreover, tourism appears to be directly and indirectly responsible for the economic prosperity of several other industries in the regional economy since it acts as a link in the flow of goods and services. This flow is generally facilitated by a series of symbiotic relationships with other industries\(^1\) which encourage long-term growth by expanding overall production and employment, and provides opportunities for increased commercial activity. The observed multiplier effects of tourism expansion in the Caribbean are therefore numerous and are characteristic of the long history of economic dependence. This suggests that the tourism industry is highly competitive, and relies on aggressive but very familiar marketing campaigns to lure visitors.

The lure of visitors to the Caribbean is facilitated by the peculiar environmental endowments\(^2\) of each island and regional governments have therefore invested heavily in developing the tourism product. The beach is arguably the main resource on which much of Caribbean tourism is based. As such, the ‘Sun-Sea-Sand’ concept is used with considerable effect in many advertising campaigns. Tourists and residents therefore place a number of use and non-use values on the natural resources in these tourism destinations. Use values are derived from the actual (or physical) use of the resource while non-use values of the resource involve no physical use of the resource but a value nonetheless for the functions/services it provides.

In the case of Caribbean tourism a number of inter-related issues emerge over the management of coastal resources. Some of these are discussed below:

- Inadequate information; a general misunderstanding of the multiple values associated with beaches; and the complex interactions between beaches and social and biophysical processes, raise issues over the carrying capacity of tourism. Researchers have reported a link between environmental quality and the volume of users at a resource, but the composition of users at a resource can also be a critical determinant of carrying capacity.

- Market failure arises because of a lack of enforceable property rights. The issue of open access to resources (\textit{vis-à-vis} property rights) is important because many tourism-related environmental resources/services are considered as public goods. Georgiou \textit{et al.} (1997) argued that the distinction between public and private goods can be blurred. As is the case in some Caribbean countries, coastal development has resulted in attempts by

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\(^1\) The Department for International Development (undated) aptly states that “Tourism is a big industry based on small business.”

\(^2\) Environmental components include natural resources (\textit{e.g.} beaches, habitats); man-made resources (\textit{e.g.} historical buildings and sites, museums); and human resources (\textit{e.g.} resident population, cultural and social characteristics).
property owners to create ‘private’ beaches by restricting access to the section of beach directly in front of their property.

- The externalities from other users (and non-users) of the resource and the social conflicts and environmental impacts that are caused by user restrictions and congestion raise the need to formulate policies that ensure adequate resource allocation and the socially optimum use of these resources. But intervention failures caused for example by inconsistency of policies can threaten the sustainability of tourism.

These three issues point to the observation that many service flows are not properly regulated by markets. The impact of externalities on environments is however difficult to quantify because no economic price is assigned to the services the latter provide. The resulting market failure inhibits economic activity and would lead to allocative inefficiency (Gwartney and Stroup, 1997).

1.2 Research Focus

1.2.1 Case Study: Barbados and the Folkestone Marine Reserve

This research sought to investigate the negative environmental impacts of tourism in the Caribbean. Specifically, the Folkestone Marine Reserve (FMR) in Barbados was used as a case study for three primary reasons: (i) it is the only marine reserve in the island; (ii) it is situated in the densely populated tourist belt and is therefore susceptible to extreme environmental shocks associated with tourist activities; (iii) anecdotal evidence suggests that it is protected only in name and is therefore not adequately managed. These factors influence perceptions of tourism development and provided an opportunity to determine the value that users would assign for improvements to assets within the FMR. The FMR would also highlight the many conflicts that exist when considering tourism development and environmental conservation.

1.2.2 Estimating Economic Values

In order to determine the values that users would assign to the FMR, the economic value of proposed environmental management changes in the FMR and their component attributes were estimated using stated preference (SP) techniques. Stated preference techniques are survey-based methods that are commonly used to understand consumer behaviour and to estimate environmental values by asking individuals to state their preferences in monetary terms when provided with alternative outcomes of the environmental good/resource in question (Mitchell and Carson, 1989; Bennett and Blamey, 2001; Bateman et al., 2002). Choice Modelling (CM) and the Contingent Valuation Method (CVM), two of the most widely used stated preference techniques, were used in the current analysis. This report however focuses on the outcomes of the CM approach only.

The Choice Modelling (CM) procedure uses a selection of alternative scenarios from which respondents are asked to choose the one they most prefer—this particular CM approach is commonly known as Choice Experiments in the literature. The alternatives in the CM procedure are constructed from different attributes that define the good (in this case the FMR) and these attributes are themselves composed of different levels. Analysis involves modelling the probability of an alternative being chosen with respect to the attributes and levels used to
describe it. When dollar amounts are included as one of the attributes, willingness to pay for the remaining attributes and for the scenarios can be directly inferred. Other inferences that can be drawn from the results of the CM include evaluating the trade-offs made between the various scenario attributes and predicting respondents’ behaviour when presented with different scenarios.

1.2.3 Analysing Public Perceptions
In terms of the analysis of public perceptions the research will identify and classify the perceptions and attitudes of tourists and residents toward tourism development and the environment using a data reduction and classification technique called Cluster Analysis. Cluster Analysis reveals structure and relations in data by grouping observations with a high degree of similarity. This grouping is done in such a way that the degree of similarity is low between members of different groups and high among members of the same group (Anderberg, 1973; Hair et al., 1998; Malhotra, 2004). The outcomes allow a better understanding of resident and tourist perceptions towards tourism and the environment in Barbados.

1.3 Aims and Objectives

1.3.1 Research Aim
The aims of this research are:

• To investigate how the social, environmental and economic impacts of tourism development in Barbados influence public perceptions of tourism development.
• To measure the willingness to pay for environmental management changes at the Folkestone Marine Reserve.

1.3.2 Research Objectives

The research objectives are described as follows:

• To analyse variations in public attitudes towards tourism and the environment between residents and tourists.
• To create a typology of different classes of respondents based on the variations in their attitudes towards tourism and the environment.
• To estimate the economic value that residents and tourists attach to a number of proposed environmental management changes to the FMR.
• To predict the level of public support to proposed changes in the environmental attributes of the FMR.
• To discuss how the findings can be used to inform policy both at a project level and at a more macro level of setting national and sectoral policies especially as they relate to tourism growth, the environment, and development.

The outcomes of the research will also be valuable for other small island developing states (SIDS) because they share similar challenges to sustainable development. These challenges (as identified by the United Nations) include: small populations; lack of resources; remoteness; susceptibility to natural disasters; excessive dependence on international trade; vulnerability to global developments; lack of economies of scale; high transportation and communication costs; and costly public administration and infrastructure. As such, the inferences and/or policy
prescriptions developed in this report may also be relevant to the tourism/development strategies in other SIDS.

2.0 LITERATURE REVIEW

2.1 The Use of Cluster Analysis in Tourism Studies

Ap (1992) and Gursoy and Rutherford (2004) highlighted the need to distinguish the positive and negative aspects of tourism in order to provide a clearer understanding of the attitudes that evolve in response to tourism activity. Moreover, Stoeckl et al., (2006) asserted that different types of tourists behave differently and would, as a result, have an impact on the local community. Madrigal (1995) and Fennell and Butler (2003) therefore advocated the classification of tourists based on the pressures and impacts they place on host communities. The characteristics of these groups can be used to inform tourism planners (for example) of the issues that must be addressed in subsequent management policies or initiatives, and therefore gives direction and scope to the short-term and long-term planning process (Seddighi and Theocharous, 2002).

The categorisation of groups can be achieved through the use of a classification technique called Cluster Analysis. The literature on cluster analysis in tourism studies is however very limited (Aquilló Pérez and Roselló Nadal, 2005). Aquilló Pérez and Roselló Nadal (2005: 927) further argued that hardly any studies have been devoted to the segmentation of resident perceptions and attitudes in a region undergoing the final stages of tourism development where the environment is both fragile and fundamental for future economic development.

Davis et al. (1988); Ryan and Montgomery (1994); Madrigal (1995); Fredline and Faulkner (2000); and Galloway (2002) have all used Cluster Analysis in tourism studies but none of these have focussed on tourism-related issues in small-island states. For example, Ryan and Montgomery (1994) applied Cluster Analysis to residents in Bakewell (UK) to assess the degree to which residents were homogeneous in their attitudes toward tourism. Three clusters were generated from the clustering technique all of whom differed in their support for tourism development.

Fredline and Faulkner (2000) identified five distinct social groups of residents that were affected by the Gold Coast Indy Car Race in Australia. Parallels in the perceptions of communities to tourism were drawn between Fredline and Faulkner’s results and those of Davis et al. (1988) in their study of tourism attitudes in Florida, and between those of Madrigal (1995) who evaluated residents’ support for tourism policy decisions across cities in the USA and UK. Different clustering techniques and populations were used in each of these three studies, but the results clearly showed that the clustering technique is a useful tool for cross-national and longitudinal studies in comparing attitudes between and among communities. Galloway (2002) used cluster analysis to differentiate individuals according to their attitudes and behaviour toward sensation seeking when visiting provincial parks in Ontario, Canada. Three clusters were created which differed in relation to (i) the frequency of visits to the park—higher sensation seekers recorded more visits to the park than low sensation seekers; (ii) the features of the park that encourage
visits—higher sensation seekers are more likely to visit the park because of its features and the availability of user information; (iii) participation in activities—higher sensation seekers are more likely to participate in a wide range of activities during their visits, and place greater importance on the facilities and services that are available. These findings are important to the current research because they imply that attitudes and behaviour of users of the FMR will also vary according to the frequency of visits, the type of activities they participate in, and the features of the FMR that are likely to be incentives for visits.

2.2 The Use of Stated Preference Techniques in Tourism Studies

To the author’s knowledge, very few studies on the environmental changes within the tourism industry of small island states have been documented in the academic literature. As a result of this dearth on information, the current discussion is restricted to the following contexts that are considered as relevant to the research:

- Recreation and eco-tourism
- Marine and coastal resources
- Sewage and water quality studies
- Social impacts

2.2.1 Valuation Studies in the Tourism Industry of Barbados

Two earlier valuation studies focussed on the tourism industry in Barbados but their relevance to the current research is only peripheral even though both sought to estimate WTP values for environmental resources. Dharmaratne and Brathwaite (1998) and Dharmaratne et al. (2000) were the only researchers to use the CVM to estimate the economic cost of natural resources in the tourism industry of Barbados. Their research sought only to determine the WTP to access recreational sites. The Dharmaratne et al. (2000) study estimated the use value of two parks in the Caribbean by estimating the WTP for access to the Montego Bay Marine Park in Jamaica and the proposed Barbados National Park. The Dharmaratne and Brathwaite study used a combination of revealed preference techniques (i.e. the TCM) and stated preference techniques (i.e. the CVM) to value all beaches along the west and south coasts of Barbados. In contrast, this research used stated preference techniques only (i.e. the CVM and CM) in the valuation of environmental improvements to a section of the coastline that is of high biological and social interest (the Folkestone Marine Reserve). There are therefore significant differences between the DB and DWS studies and the current research:

- The studies by Dharmaratne and Brathwaite and Dharmaratne et al. did not derive welfare estimates for changes in the attributes that make up the resource under study. In the current research the welfare estimates are derived for the attributes that comprise the FMR as well as for combinations of these attributes.
- Dharmaratne and Brathwaite estimated the access value of beaches along the west and south coasts of Barbados. In this study respondents were asked, using the CVM approach, to state their WTP for a beach pass to use the beaches. The TCM was used to determine the access value to all activities on the island. Dharmaratne et al. focussed on the terrestrial resources on the east coast of the island. The current research, on the other hand estimates WTP for changes in specific environmental attributes that make up the FMR.
• Both studies were directed to tourists only. In the current research both residents and tourists are targeted and their WTP are predicted for different policy scenarios related to the management of the FMR.

As highlighted above, Dharmaratne et al. (2000) estimated the use and non-use value of the Montego Bay Marine Park in Jamaica and the proposed Barbados National Park in Barbados. The CVM was used to explore options for recovering these values from tourists visiting these sites. The authors found that the non-use values for the Barbados National Park were higher than those for the Montego Bay Park. This difference was attributed to their functions: the environmental features of the Montego Bay Park are primarily coastal while those for the Barbados National Park are terrestrial. The authors also concluded that repeat visitors to Barbados are less likely to visit the park if access fees are imposed. The relevance of this study is revealed in the potential of protected areas to generate revenue from their existence.

In their study of the non-market amenities within the Monteverde Cloud Forest Reserve in Costa Rica Echeverría et al. (1995) concluded that the biological resources and other amenities provided by the reserve was very important to both residents and non-residents as was reflected in their WTP for preservation. Respondents opted for environmental preservation over economic development. Similar results were provided by Hadker et al. (1997) in their study of the WTP for the Borivli National Park (India), and Lee and Han (2002) in their estimation of the use and preservation (non-use) values of five national parks in Korea. Hadker et al. found that residents who were pro-environment had the highest WTP for preservation of the Borivli National Park, followed by those who favoured trade-offs between environmental management and development, and those who favoured development. Lee and Han also found that use and non-use values are influenced by geographical distance. For example respondents who were further away from the park expressed higher use values than those located closer to the park. Conversely, those situated, closer to the park had higher preservation value than those further away.

Lee et al. (1998), in an unrelated study, investigated the economic value of ecotourism resources compared with ski resort development in Mt. Minju, South Korea. Their study revealed that use of the resource for ecotourism purposes generated greater welfare benefits than its alternative use as a ski resort. More importantly, the results confirmed that nature-based tourism generates low leakages compared to larger scaled developments (e.g. golf courses, hotels). These findings are pertinent to the research because they suggest that there are greater benefits to be gained from environmental preservation than from large-scale development. They also suggest that non-use values may predominate when estimating WTP values.

The implications of the latter comment were highlighted in a study by Day and Mourato (2002). In this study they estimated the value of improving water quality in the rivers around Beijing, China and found that respondents expressed a significant degree of non-use values (e.g. existence, bequest, option and altruistic value) for river preservation. Results showed that although residents ranked environmental quality among their top priorities, surface water quality was ranked fourth behind air pollution, waste management, and drinking water quality. As a result residents expressed zero WTP for river water quality changes. Moreover, the authors
concluded that transferability of WTP values is possible between rivers even though the rivers may be different.

In valuing household demand for water quality improvement of the beaches in the Philippines, Choe et al. (1997) found that the low WTP for water quality improvements was due to residents assigning lesser importance to water quality improvements and beach clean up although they acknowledged that poor water quality affected their recreational opportunities. According to Choe et al. the results are consistent to what is observed in developing countries: there is an awareness of the negative impacts of environmental damage, but there are more pressing concerns in the lives of residents than a lack of recreational opportunities. It is therefore likely for communities that contribute to environmental damage to internalise these damages as reflected in their low WTP. The authors therefore concluded that since public education programmes geared toward increasing the demand for water quality improvement are unlikely to increase WTP, the appropriate strategy seems to be to postpone large water pollution control programmes until WTP increase by way of higher household income. These findings however contradict the assertions of Lee et al. (1998) because they infer that economic development is the precursor to environmental preservation.

In the same vein, McConnell and Ducci (1997) assessed the value of water quality improvements in Barbados and Uruguay by estimating household WTP for a sewerage system using the CV approach. The results provided evidence that households valued environmental quality but the derived models did not explain much of the responses. Hence other factors were likely to have influenced the importance respondents placed on water quality improvement. Moreover the results showed that beach users were willing to pay more for water quality improvements than non-users. This result was therefore consistent with economic theory. McConnell and Ducci however raised important methodological issues regarding the use of CVM in developing countries. Specifically, they suggested that temporal aspects of CVM studies may be peculiar to developing countries, and is exemplified by the time pattern of payment. The authors concluded that households in developing countries are sensitive to the type of payment methods used. This means that it is necessary for either the inclusion of a time element in the payment method, or the payment vehicle must be in the form of a tax.

Blamey (1998) supports the inclusion of contingencies in questionnaire formats. In his CV study of individuals’ WTP for preservation of the Coorong in Australia, Blamey found that preservation of the study site was less of an environmental priority than local issues (e.g. water pollution) or international issues such as global warming. As a result WTP estimates are expected to be based on important criteria such as the relevance of the project and the plausibility of the intervention. Blamey therefore advises practitioners to include in their surveys information that addresses the concerns of respondents (e.g. the fairness of the proposal; why government is unable to pay for the proposed changes; and how contributions would be allocated and managed). This is particularly important because Blamey found that the way in which individuals construct, modify and defend their preferences is largely influenced by the complex nature of environmental preferences and the situational cues that dominate.

In addition, Shroeder and Louviere (1999) used CM to predict the impact of recreation fees on the choice of recreation site in the US Forest Service. The results highlighted the versatility of
the CM technique as it was applied to multiple sites and allowed managers to predict the choice behaviour in response to changing management/policy decisions. The use of CM in real life scenarios is however tempered by the caution that the choice models that are developed are useful only if they include all the attributes that individuals consider in making their choices. Shroeder and Louviere therefore advised that the models may be inaccurate if some of the sites have unique features that cannot be adequately described with a discrete list of attributes. The value of the technique however remains since it can still provide useful information on respondents’ preferences and their values of the listed attributes. More importantly, the research outcomes indicated that care must be taken when respondents are unfamiliar with the policy scenario. The authors therefore suggested that their models might be inappropriate for predicting the behaviour of respondents to the imposition of fees at sites where visitors have never had to pay fees.

A similar study to that of McConnell and Ducci (1997) was conducted by Whittington et al. (1993, cited in Georgiou et al. 1997). In this study the household demand for improved sanitation services was evaluated for Kumasi, Ghana. The results showed that socioeconomic variables such as gender had little or no influence on individuals’ WTP for improved sanitation or water services—a similar conclusion was made by Johnson and Baltodano (2004) who also employed the CVM to estimate the value of improving local water quality and quantity in the Rio Calico watershed in Nicaragua. The WTP estimates calculated by Whittington et al. however did not appear to reflect respondents’ level of awareness of the health implications of current sanitation practices. Instead, the results seemed to reflect respondents’ perceptions of the value of improved sanitation options.

In using the CVM to study the impacts of waste water treatment on choice behaviour, Kontogiani et al. (2001) asserted that residents of Thessaloniki (Greece) used a variety of motivational factors in expressing a WTP for water quality improvement in Thermaikos Bay. Motivational factors ranged from “the very practical and utilitarian (such as smell) to altruistic and ethical concerns (such as future generations and moral matters).” (Kontogiani et al. 2001: 9). Higher WTP was associated with income, opposition to the smell of the Bay, having young children (under 5 years old), membership of an environmental organisation, and knowledge of the treatment plant. In contrast, individuals who believed that the source of pollution was industrial had a negative WTP and therefore believed that the polluter(s) should pay for the improvements. The study therefore speaks to individuals’ capacity to consider environmental, health, social and ethical issues in expressing their preferences/WTP, and is a departure from the deductions made by Whittington et al. above. The findings of Le Goffe (1995) and Machado and Mourato (2002) are however consistent with those of Whittington et al.

Le Goffe (1995) and Machado and Mourato (2002) each used stated preference techniques to investigate public preference for water quality improvements. Le Goffe employed the CVM to investigate the economic values individuals assigned to improved water quality in the Brest natural harbour (France); while Machado and Mourato used the CVM and Contingent Rating to investigate the health benefits and amenity values that local beach users derive from improvements to marine water quality in Lisbon, Portugal. In Le Goffe’s contingent valuation study two scenarios were used: the effects on human health; and the effects on ecosystem health. Le Goffe determined that individuals placed a higher value on the effects on human health than
on the ecosystem benefits resulting from improvements in water quality; but difficulties in understanding the scenarios and the unfamiliarity with the good may have contributed to more protest bids being observed for the ecosystem good. In contrast Machado and Mourato showed in their study that though individuals derived a positive health benefit from water quality, improvements recreational and amenity use values dominated the user benefits from such improvements. In addition individuals appeared to underestimate the health costs associated with using heavily polluted beaches. As a result, the authors contend that policy measures aimed at enhancing beach water quality should focus on promoting the amenity values that result instead on the health benefits alone.

Kaoru (1995) modelled the effects of water quality improvements for marine recreational fishing in North Carolina and showed that a group of recreationists usually comprises different individuals with different preferences and motives (e.g. relatives, friends, business associates). ‘Party composition’, participation in recreational activities, and site choice decisions are therefore thought to influence WTP. Kaoru found that ‘party composition’ affects the budget constraints of the group and therefore affects recreational behaviour and choice decisions. Though not directly related to the current research insofar that it does not estimate environmental values in developing countries, Kaoru’s research points to the importance of (i) identifying individuals who share similar attitudes and perceptions of tourism and the environment; and (ii) investigating how their profile influences their choice behaviour. This research adds to the current literature by describing the attitudes that prevail within the tourism industry. How individuals’ perceptions of tourism development influence their choice for environmental management changes is also the subject of analysis in the CV and CM exercises in the current research.

Huang and Poor (2004) investigated the preferences for beach erosion control programmes in Maine, USA. It was asserted that the erosion programmes will cause multiple effects on the beach. Hence, investigations were conducted to determine individuals’ preferences for control programmes based on the effects they create. These effects were treated as attributes and included beach, preservation, property protection, visible structure, restricted beach access, hazards to swimmers, alteration of wildlife habitat, erosion of neighbouring beach, and water quality deterioration. Results highlighted that individuals exhibited low preferences for property protection and visible structures in assessing the erosion programmes, whereas the potential negative effects of erosion on wildlife habitat, erosion of neighbouring beach, and deterioration of water quality factored significantly in individuals’ choices. The authors however conceded that the omission of recreation values from the study was a shortcoming since a beach erosion control programme would affect recreation activities at the site.

In evaluating multiple water supply options in the Australian Capital Territory Blamey et al. (1999) highlighted a positive relationship between age and the probability of selecting the base (current) option among respondents when using the CM approach. This characteristic contradicts the findings of Whittington (1993, cited in Georgiou et al. 1997) and Johnson and Baltodano (2004) above, and was attributed to older residents being more averse to change than younger residents. Older residents however placed greater importance on reductions in household water use and were more concerned about price increases.
Hearne and Salinas (2002) used choice experiments to analyse the preferences of tourists regarding the development of the Barva Volcano Area in Costa Rica. Their study found that respondents had a preference for site development, the provision of more information, better views, and more modern infrastructure. In addition, the study demonstrated the successful application of CM in analysing the user preferences in developing countries. Table 1 summarises the findings of key stated preference studies that are pertinent to this research.

### Table 1: Summary of Key Choice Modelling Studies in the Literature

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Choe et al. (1997)</td>
<td>Residents in the Philippines assigned lesser importance to water quality improvements and beach clean-up. Asserted that this may be typical in developing countries where environmental concerns are not paramount. Consequently, individuals may internalise the negative effects of environmental damage which may explain their low WTP for changes.</td>
</tr>
<tr>
<td>Shroeder and Louviere (1999)</td>
<td>Predicted the impact of recreation fees on the choice of recreation site in the US Forest Service. Advised that models may be inaccurate if some of the sites have unique features that cannot be adequately described by an attribute list</td>
</tr>
<tr>
<td>Day and Mourato (2002)</td>
<td>Individuals expressed significant non-use values for river preservation in Beijing (China) but surface water quality was not listed among their top three priorities. Transferability of WTP values between rivers is possible. Argued that beach valuation studies rarely emphasize the potential multiple effects of erosion control methods on coastal environments. Results however showed that individuals expressed significantly positive preferences for erosion control programmes that addressed the impacts on wildlife habitat, erosion of neighbouring beaches, and the deterioration of water quality. Impacts on property protection and visible structures resulting from such programmes did not have a significant influence on choice behaviour.</td>
</tr>
<tr>
<td>Huang and Poor (2004)</td>
<td>Investigated the preferences for water quality improvements for marine recreational fishing. Concluded that the ‘group dynamic’ influenced individuals’ motives and preferences.</td>
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### 3.0 METHODOLOGY

This research used the survey approach to investigate residents’ and tourists’ perceptions of tourism development in Barbados and to record their support for environmental management changes within the FMR. The variables used in the investigation were developed following an in-depth review of the literature and were refined following interviews with subject matter experts (SME) in the Ministry of Tourism and Ministry of Environment (Government of Barbados). After two rounds of piloting, the variables were further refined where major reworking occurred in the specification of the attributes and attribute levels. The survey was divided into 5 sections labelled A to E and was common to both samples. Questions were concise and simple in order to facilitate self-administration. Section A in the tourist questionnaire
was prefaced by 3 tourist-specific questions: (1) number of visits to Barbados; (2) duration of visit; and (3) main reason(s) for visit. This section was labelled ‘Beach Use in the Folkestone Marine Reserve’ and collected information on beach activities, the frequency of beach visits, and respondents’ level of participation in a selection of beach-related activities. Assessments of the level of participation were collected using a 4-point scale anchored by 1 (“Often”) to 4 (“Never”). Respondents were also asked to rate the quality of the physical features of the beaches within the study site using a 5-point Likert scale, anchored by 1 (“Very Bad”) and 5 (“Very Good”).

The questions contained in Section B—‘Tourism and the Environment’—measured respondents’ opinions regarding tourism in Barbados. In so doing, perspectives on the developmental path of the industry in Barbados and the impacts that are thought to result from this development were gathered. More specifically, respondents were asked how important they thought beaches were to the economy of Barbados, and which category of social group (residents or non-nationals) derives the most economic benefits from tourism in Barbados. In addition, respondents were asked to (i) select the action(s) of residents and tourist which they consider to have negative consequences on the beaches in Barbados; (ii) indicate whether they thought tourism development would cause an increase or decrease in a selection of tourism-related factors (e.g. real estate prices, access to beaches, marine pollution, etc.), and the magnitude of these changes (a 5-point Likert scale was used to indicate the extent of expected change. The anchor points were 1 (“Large Decrease”) and 5 (“Large Increase”)); (iii) highlight which tourism-induced impact affects them most; (iv) indicate their opinion of the level of protection provided for beaches in Barbados. An indicator variable was also included to determine if respondents were pro-development or pro-environment.

Section C was the valuation section. The valuation questions were preceded by a description of the current environmental conditions within the study area, and included a ranking exercise of the attributes. The articulation of the research issues made it possible then, to construct the choice task designs based on the main elements that influence choice, and accounted for the complexities that can result in such designs. Section D contained follow-up questions which examined the reasons for the choices made. Section E was labelled ‘General Information’ and collected socio-economic data (e.g. age, gender, education, income) from respondents. All demographic variables were measured as categorical data and were some of the predictor variables used in the attitudinal study and preference studies.

### 3.1 Attribute and Level Selection

In addition, discussions with various stakeholders revealed a number of issues relevant to the case study. A series of personal and telephone interviews were conducted with the aim of gaining some idea of the issues policy-makers and consumers (residents and tourists) perceived to be important considerations in tourism management. It was from this information source that the preliminary set of potential policy sensitive attributes was selected. Though it is essential not to exclude important attributes, the exclusion of causally prior attributes is preferred even if they are deemed important to people (Bennett and Adamowicz, 2001). The attributes selected based on the above observations were therefore:
Column 2 of Table 2 provides a further description of these attributes as presented to respondents. These attributes were therefore thought to have the ability to adequately reflect some of the elements of the environmental and social changes that were important to residents and tourists, while paying attention to the limitations of the survey method with respect to cognitive burden and the methodological sensitivities highlighted. Moreover these attributes were thought to provide a realistic link between values accruing to tourists and residents since they are not atypical of developments that occur within tourism.

### 3.2 Selection of Attribute Levels

Having defined the attributes, the range of their levels was determined by further discussions with stakeholders and SMEs. Quantitative expressions have distinct advantages over qualitative expressions (Bennett and Adamowicz, 2001) but it was not possible to use quantitative expressions of the ranges of attribute levels because the attributes are typically qualitative. Furthermore it was believed that including quantitative measures of the attributes would decrease the cognitive ability of respondents who were, at the onset, unfamiliar with the CM and CVM type of questioning adopted in this research. Particular care was therefore taken in the description of these features so as to make the levels relate to the respondent’s perception of the attributes, bearing in mind that they had to be as realistic as possible. The attribute levels are also presented in Table 2.

### 3.3 The Payment Vehicle

The survey was structured such that an environmental (conservation) levy was introduced as the payment vehicle on the basis of the user-pays principle. This levy also gives the assurance that all members of society would be required to pay and circumvents ‘free-riding’. The price levels for the payment vehicle are presented in Table 2. At the time of the study there was a mandatory departure tax of BDS$25.00 (US$12.50) per person for residents and tourists in Barbados. The range of bid levels was therefore set around this figure. The range of bid levels for the tourist sample was however set higher than the residents’ because the pilot survey showed that tourists were willing to pay higher amounts for the changes than residents. The bid levels used in the CM exercise were allocated to the options in the choice sets so that each bid level appeared at least once.

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3 For example: hoteliers and personnel from the Coastal Zone Management Unit (CZMU), the Barbados Hotel and Tourism Authority, the Ministry of Tourism, Barbados Water Authority, Folkestone Marine Reserve were asked for their opinions regarding the feasibility and level ranges of the attributes.
Table 2: A Description of the Choice Set Attributes and Levels

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Current Condition</th>
<th>Attribute Level (and acronym)</th>
</tr>
</thead>
</table>
| Sewage Treatment   | Households and some businesses have their own septic tanks and/or wells for the disposal of sewage. Hotels are required to treat their sewage. Most sewage is treated to low quality (some is then used for irrigation or discharged into the sea). Government plans to connect all properties along the west coast to a central sewerage system. A sewerage system would improve seawater quality and the health of coral reefs. | - No change from current situation. (sew_cur)  
- Most sewage treated to moderate quality. Suitable for irrigation. (sew_mod)  
- Most sewage is treated to high quality. Suitable for bathing. (sew_hi) |
| Facilities/Information | There is one lifeguard station, beach rangers, one facility with public showers/toilets, and moderate parking facilities. | - No change from current situation. (fac_cur)  
- Signposts showing zones and user information. (fac_sign)  
- More public showers/toilet. Signposts showing zones and user information. (fac_wcs) |
| Watersports Zoning  | The Reserve is divided into two watersports zones, one scientific zone, and one recreational zone. All watercrafts (e.g. jet skis, catamarans glassbottom boats etc) can enter the recreational zone but speed restrictions apply. | - No change from current condition (wat_cur)  
- Recreational zone reduced. Expansion of watersports zone. (wat_exp)  
- Total exclusion of watercrafts from recreational zone. (wat_exc) |
| PAYMENT VEHICLE Conservation Levy (Residents) | An annual conservation levy from all households to pay for improvements. Payment of the levy (in Barbados Dollars) would be compulsory and would depend on the management options selected. | $9 $15 $20 $37 $48 $70 |
| PAYMENT VEHICLE Conservation Levy (Visitors) | For adult tourists a conservation levy would be charged per visit to the island. Payment of the levy (in Barbados Dollars) would be compulsory and would depend on the management options selected. | $15 $25 $43 $60 $74 $100 |

4.0 RESULTS

4.1 Characterising the Attitudes of Resident and Tourist Communities towards Tourism Development

The analysis of resident and tourist attitudes employed three basic steps:
• A survey tool designed to elicit perceptions of tourism impacts, and gather demographic information of respondents.
• Identification of distinct clusters from the responses using cluster analysis based on squared Euclidean distance (i.e. the straight line distance between two points)
• Labelling of the clusters based on comparisons of survey responses

The different attitudes and perceptions among respondents enabled one to select several variables that were believed to be useful in describing individuals. As such 20 independent variables (Table 3) were selected from the survey instrument as suitable indicators because of their \textit{a priori} ability to extract:

• \textbf{Policy-related attitudes} which monitor opinions towards the policy- and decision-making mechanism in tourism management and assess the level of support for beach management in particular.
• \textbf{Attitudes towards economic growth} resulting from tourism development. This category measures the importance of tourism to economic development.
• \textbf{Environment-related attitudes} which determine the existence of associations between tourism development and environmental change.
• \textbf{Social attitudes} to examine the sensitivity of respondents to the social impacts of tourism development.

Factor analysis was not used to reduce the variables because they were relationally distinct. Cluster Analysis is capable of evaluating the variability in the resident and tourist sample and extracting groups of individuals with similar views about tourism activity in Barbados. The groups are then described according to their attitudinal profile. As such, demographic variables were excluded from the clustering procedure so that respondents could be grouped by their attitudes and perceptions alone (Aguilló Pérez and Roselló Nadal, 2005). Clustering of the respondents was performed using the statistical software package SPSS for Windows (version 11.0, SPSS Inc. 2001). Since qualitative variables were used, no standardisation was necessary (as a precaution, analyses were run separately with standardised and non-standardised data and no difference in the results was noted). As outlined, cluster analysis was performed using squared Euclidean distance. Different clustering methods (e.g. Linkage Methods, Variance Methods and Centroid Methods) were used for both samples and the results were compared. There was no difference in the number and classification of the clusters. As a result, the data presented below, and subsequent interpretations appear to be reliable and valid.

Ward’s procedure was used to generate the clusters. In this procedure, the means of all the variables were computed and for each cluster, the squared Euclidean distance to the cluster means was determined. The distances were summed for all the cases and the clusters that experienced the smallest increase in the overall sum of squares within the cluster distances were combined. The Parallel Threshold Method (for selecting the final clusters) created 5 distinct resident clusters or groups (cluster A, B, C, D, and E) from the 159 respondents with valid responses and 3 tourist clusters (F, G, and H) from 102 valid submissions.
4.2 Attitudinal Analysis of Residents in Barbados

One can hypothesize that since residents’ and tourists’ visual impressions of nature in Barbados vary, their perceptions of tourism development and environmental change would also vary. It is argued that tourists formulate stereotypes of the destinations they visit and assign different levels of importance to environmental change within. Residents on the other hand have traditionally relied on the environment for sustenance and therefore have different perceptions of it. As it stands the null hypothesis ($H_0$) is that the perceptions of residents in Barbados are different from those of tourists. The alternative hypothesis ($H_1$) is that the perceptions of both groups would be the same:

$$H_0: \text{Perceptions}_{\text{Residents}} \neq \text{Perceptions}_{\text{Tourists}}$$
$$H_1: \text{Perceptions}_{\text{Residents}} = \text{Perceptions}_{\text{Tourists}}$$

In the following sections the resident attitudes are first described, and are followed by a description of tourist attitudes.

4.2.1 Trends in Group Perceptions

The inter-group variability among cluster centroids for the resident sample is presented in Table 4. Note that two of the clusters (Clusters C and D) were small, having only 14 and 8 members, respectively. In a departure from convention, these clusters were preserved as it is likely that they were under-represented sub-samples of the population that share the opinions peculiar to the groups. Preserving these clusters is also important from the standpoint that they maintain the randomness of the sample and therefore prevent sampling errors—Edwards and Anderson (1987) argued that though the probability of selection need not be identical, they should be non-zero so as to prevent sampling error. This is also crucial for valuation exercises when determining whether the preferences for environmental changes are influenced by the characteristics of the cluster.
<table>
<thead>
<tr>
<th>Variables/Questions</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency of visits to the FMR in the past 12 months</strong> <em>(for the resident sample only)</em></td>
<td>1=Seldom; 2=Occasional; 3=Frequent; 4=Habitual</td>
</tr>
<tr>
<td><strong>Number of visits to Barbados</strong> <em>(for the tourist sample only)</em></td>
<td>1=first visit; 2=Second visit; 3=Third visit; 4=Fourth visit; 5=Fifth visit or more</td>
</tr>
<tr>
<td><strong>How important do you think beaches are to the economy of Barbados?</strong> *</td>
<td>1=Very important; 2=Important; 3=Of average importance; 4=Of little importance</td>
</tr>
<tr>
<td><strong>Who do you think would benefit most economically from tourism in Barbados?</strong> **</td>
<td>1=All benefits will go to residents; 2=Most to residents &amp; some to non-nationals; 3=Both benefit equally; 4=Most to non-nationals &amp; some to residents; 5=All benefits will go to non-nationals</td>
</tr>
</tbody>
</table>

**The magnitude of tourism-induced impacts on:**

(i) The cost of housing and land *
(ii) Destruction of coral reefs *
(iii) Public input in decision making *
(iv) Beach erosion *
(v) Environmental damage *
(vi) Local culture & traditions *
(vii) Attractiveness of local scenery *
(viii) Access to beaches *
(ix) Number of people at beaches *
(x) Marine water pollution *
(xi) Crime and unruly behaviour *

1=Large decrease (L. Decrease); 2=Small decrease (S. Decrease); 3=No change; 4=Small increase (S. Increase); 5=Large increase (L. Increase)

<table>
<thead>
<tr>
<th>Are beaches adequately protected from the negative impacts of tourism? **+</th>
<th>1=Definitely; 2=Yes; 3=Fairly; 4=Hardly; 5=No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental protection vs. Economic growth</strong></td>
<td>1=Pro-environment; 2=Pro-development; 3=Neither (Trade-offs are necessary)</td>
</tr>
<tr>
<td><strong>Would you pay an entrance fee to beaches if all funds would be devoted to improving the beach?</strong> *</td>
<td>1=No, all beaches should be free; 2=Possibly depending on cost; 3=Possibly, depending on improvements; 4=Possibly, depending on beach; 5=Yes, it’s a good idea</td>
</tr>
</tbody>
</table>

(i) The impact on beaches affect me personally *
(ii) The impact on beaches would affect future generations *
(iii) Funds collected should not be managed by Government *

★: Policy-related attitudes
✦: Environment-related attitudes
◆: Attitudes towards economic development
▲: Social attitudes
Table 4: Distances between Final Cluster Centres for the Resident Sample

<table>
<thead>
<tr>
<th>Cluster</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.811</td>
<td>6.016</td>
<td>5.158</td>
<td>3.010</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3.811</td>
<td>4.124</td>
<td>5.657</td>
<td>3.444</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>6.016</td>
<td>4.124</td>
<td>5.657</td>
<td>5.271</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>5.158</td>
<td>4.440</td>
<td>5.657</td>
<td>5.585</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>3.010</td>
<td>3.444</td>
<td>5.271</td>
<td>5.585</td>
<td></td>
</tr>
<tr>
<td><strong>Total (N)</strong></td>
<td>48</td>
<td>34</td>
<td>14</td>
<td>8</td>
<td>55</td>
</tr>
</tbody>
</table>

The relative distances shown in the table above indicate the level of similarity (difference) in perceptions among the clusters. For example, cluster A is closer to cluster E (the distance between A and E is 3.010) than it is to cluster C (A-C: 6.016). Hence the perceptions of cluster A and cluster E are more similar (but not identical) than the perceptions of cluster A and cluster C.

The responses show that:

- There is similarity in group opinions regarding the variable ‘Importance of beaches to the economy of Barbados’. This confirms that respondents associate beaches with the viability of the tourism industry.
- Group members either seldom visited the beach or were occasional beach goers. The other classifications for beach visits (i.e. ‘frequent’ and ‘habitual’) did not appear in the outcomes.
- Residents share opinions about the economic impacts of tourism—namely, that the cost of housing and land is expected to increase as tourism development intensifies.
- Respondents were either pro-development or favoured trade-offs between environmental protection and economic development. It is interesting to note that none of the clusters described by this variable were strict advocates for environmental conservation.
- Respondents are unsure of Government’s role in environmental management. Four of the five clusters were neutral in their support of Government being responsible for managing the funds collected for beach improvement.

A typology of respondents based on the central tendencies for the clusters is presented in the sections that follow.

### 4.2.2 Cluster A: The Disengaged

The 48 respondents in this cluster represented the second largest group (30%). They are neither pro-development nor pro-environment, and believe that both residents and tourists benefit equally from tourism. In addition members appear to be conscious of the negative physical impacts of tourism since they indicated that tourism development would cause small increases in beach-related impacts (such as the destruction of coral reefs, beach erosion, and marine water pollution), and large increases in environmental damage in general. Opinions also reflect the sentiment that beaches are hardly protected from such damage. As a result, respondents seem to be indecisive as to whether or not funds collected for beach improvement should be managed by Government. They however believe that access to beaches would decrease slightly, and their willingness to pay for beach access is dependent on the cost of entry.
Despite the negative perceived impacts on the environmental variables, respondents expect the attractiveness of the local scenery and congestion levels at beaches to remain unchanged. This speaks to the seemingly disengaged nature of cluster members. Interestingly, respondents seldom visit the beach, which does not explain their ability to make comparative assessments of the impacts. This peculiarity may be described as the extrinsic dimension to host encounters within the tourism industry. According to Faulkner and Tideswell (1997) and Fredline and Faulkner (2000) the extrinsic dimension refers to variables that have an impact on the community as a whole, and not on the individual per se. The effects of this phenomenon appear to be galvanised by the group’s predictions of community-based impacts. For instance, respondents predict a decrease in public input in decision making, and access to beaches. In addition, crime and unruly behaviour, and real estate prices are expected to increase. Furthermore, group members believe that both residents and tourists would derive equal economic benefits from tourism. Williams (1998) asserted that the general difficulty in filtering the effects of tourism from the influence(s) of other powerful agents of change (e.g. the media) may dilute the possible tourism-induced impacts and render them diverse and unpredictable. This assertion may explain the fact that respondents believe that local culture and traditions are not affected by increased tourism development.

Of the 48 members of this cluster 21 were male and 26 were female. Moreover, members on average had attained a professional qualification, were employed full-time, had a mean annual household income of BD$51,000 (using mid-point of income bands) and reside mainly in St. James. The average age is 40 years.

4.2.3 Cluster B: The Monopolists
Members are pro-development given their belief that economic growth should be prioritised even if the environment suffers a little damage. Furthermore, they believe that most of the economic benefits of tourism will be directed to residents. Respondents do not believe that tourism development would be detrimental to the environment. This is substantiated by indications that no change would occur to any of the environmental variables outlined (except a small increase in the level of water pollution). These sentiments appear to be based on respondents’ belief that beaches are fairly adequately protected from the negative impacts of tourism. As a result members are unwilling to pay for entry to beaches and are undecided as to whether funds that are collected from beach entry should be managed by Government.

The cost of real estate and the level of antisocial behaviour are however predicted to increase. This indicates a limited measure of extrinsic perception of the impacts of tourism though this may also result if the level of their involvement with the tourism industry is at the point where the security of their interests is being compromised. This is a feasible postulate since Madrigal (1995) and Williams (1998) asserted that the attitudes and responses towards tourism will differ if hosts derive some benefit from the interaction. This was also a possible limitation in similar studies since King et al. (1993) highlighted their suspicions that respondents in a Fijian community may be prone to offer positive reviews about tourism development because residents in the study area benefited financially from tourism via direct royalties offered by tourism enterprises, and were either employed by or intimately associated with the tourism industry. The theories presented by Madrigal (1995) and Williams (1998) appear to support the notion that the respondents in this cluster are likely beneficiaries of tourism development. One can argue that
these respondents are self-seeking and therefore exemplify the intrinsic dimension in tourism encounters—hence justifying their description as monopolists.

The underlying issue is determining the threshold level at which intrinsic behaviour should remain intrinsic. If individuals derive more benefits than others from an activity—as is likely to be the case with respect to tourism development—the impacts that are considered to increase because of tourism may no longer remain community-based but highly subjective. Hence the assessment that the cost of housing and land, as well as antisocial behaviour are likely to increase may be influenced by a level of subjectivity rather than typifying extrinsic behaviour. This survey did not require respondents to divulge their job titles or any other relevant information that could have confirmed the assumptions made. As a result these assertions are strictly speculative. Owing to interpretations of the observations, the only conclusion that can be drawn is that respondents in this cluster are supporters of tourism development.

Members of Cluster B are predominantly female and the average age is 40. Most members attained O’Levels, GCSEs or equivalent as their highest level of education and are in full-time employment. The average household income was BD$51,000/year and the majority of residents reside in the parish of St. Michael.

4.2.4 Cluster C: The Tolerant
An overall positive or tolerant outlook on tourism is exhibited by the 14 members of this group and is manifested by the small negative impacts predicted for the environmental components and positive impacts predicted for a selection of social components of tourism development. The cost of real estate, and public participation in tourism (and environmental) planning are expected to slightly increase but access to beaches is not expected to change from the status quo. The Tolerant believe that local culture and traditions would decrease slightly, which is contrary to the opinion held by The Disengaged and The Monopolists (Clusters A and B) who believe that local culture and traditions would remain unchanged.

The possible impacts on coral reefs are believed to be only small, while small decreases in impacts are predicted for beach erosion, environmental damage, and marine water pollution. This positive outlook is further substantiated by the belief that the attractiveness of the local scenery would increase. These perceptions may be the main drivers in the respondents’ willingness to pay for entry to the beach; but does not reconcile the contradiction that beaches are hardly adequately protected from the negative impacts of tourism. The attitudes of members may be based on the recognition that economic growth should be prioritised even if the environment suffers a little, and is tempered by the conviction that the impacts on beaches would affect future generations. The characteristics outlined above suggest that this group belong to the Dominant Social Paradigm proposed by Milbrath (1996). Milbrath posited that members of the Dominant Social Paradigm prioritise economic growth while accepting the risks of environmental change on the premise that in the future, science would be able to solve any problems created.

There is an equal proportion of males and females in this group. They are on average 40 years of age and the majority are college or university educated and are in full-time employment. Average household income is BD$33,000/year and most members reside in St. Michael. When compared with the demographic characteristics of the Disengaged the equivalent characteristics
of the Monopolists appear specious especially when household income is matched to educational achievement (i.e. The Tolerant have a higher educational attainment than The Disengaged but a lower household income). This may be an artefact of the cluster but it further strengthens the prevailing argument that demographic data used in isolation are unreliable in differentiating sub-samples of individuals.

4.2.5 Cluster D: TheAffected
Members of this cluster believe that most of the economic benefits of tourism will be conferred on non-locals and some to residents—a departure from the views of members from previous clusters who believed that residents receive more or less equal benefits from tourism. In addition, the regularity of beach visits of cluster members increases when compared to previous clusters: the members of this group are occasional beach-goers and are therefore presumed to offer different perspectives on tourism and the environment as a result.

Members predicted that tourism development would cause small increases in beach erosion and environmental damage, but the impacts on coral reefs are expected to decline slightly. Marine water pollution on the other hand would not be affected by tourism, and the attractiveness of the local scenery would not change as a result. Owing to these assertions respondents surprisingly consider beaches to be fairly protected from the negative impacts of tourism. In addition, the cost of real estate is expected to increase, and antisocial behaviour expected to decrease slightly; but trends in the effects on the remaining social impacts are somewhat unpredictable—thereby reiterating Williams’ (1998) assertion that the general difficulty in filtering the effects of tourism from the influence(s) of other powerful agents of change may dilute tourism-induced impacts and make them diverse and unpredictable. For instance, The Affected believe that the public would be afforded fewer opportunities to participate in the decision-making process and that the impacts on local culture and traditions would increase slightly. Also, this group predicts that access to beaches would increase as a result of tourism development but congestion levels at beaches would remain the same. This latter view is not logically consistent and the ambivalence suggests some level of disassociation from the causal influences of tourism, and speaks to the group’s affected state (i.e. their awareness of the impacts of tourism are unconvincing). Members are primarily pro-development and unaffected by the impacts on beaches. They do not believe that the impacts on beaches would affect future generations, and their willingness to pay for beach access is contingent on the beach for which entry fees are sought. They are however undecided as to whether Government should be responsible for the management of funds collected for beach management.

There is an even split in the male to female ratio of cluster members. The average age is 40 years and most members are self-employed, having attained a college, university, or equivalent degree as their highest educational qualification. Annual household income averages around BD$57,000 and most members reside in St. George which is located in the middle of the island and is one of two parishes with no coastline. This latter characteristic may also explain why members appear to be unaffected by the impacts on beaches.

4.2.6 Cluster E: The Pragmatists
Members of this cluster are pragmatic because they recognise the importance of tourism for economic growth and believe that both residents and non-residents benefit equally from tourism.
They therefore think trade-offs between environmental protection and development are necessary given the importance of these elements to development. Group members are occasional beach-goers and as a result, are personally affected by the impacts on beaches. It is not surprising therefore that there is some polarity in the opinions of this group and those of The Affected. The Pragmatists believe that because beaches are hardly protected from the impacts of tourism, future generations would be affected by such impacts on beaches. According to members, tourism development is associated with increases in the attractiveness of the local scenery; the destruction of coral reefs; beach erosion; environmental damage; and marine water pollution.

Increases are also predicted for the cost of housing and land, local culture and traditions, and antisocial behaviour; but public input in decision-making and access to beaches would remain unchanged. These impacts therefore appear to influence the decision of group members not to pay for access to beaches. They also oppose Government’s involvement in the management of funds collected through this process.

The average age of respondents belonging to this cluster is 40 years. The highest qualification attained is a college degree (or equivalent) and the average member is in fulltime employment. The average household income for members is BD$51,000/year and most members reside in St. Michael.

4.3 Attitudinal Analysis of Tourists in Barbados

It is inferred that the attitudes and perceptions of tourists in a destination would invariably differ from those of the host community in a number of scenarios and for a number of reasons. Besides motivational differences that characterise a tourist, differences in experiences between tourists and hosts are likely given the cultural and societal complexities that dominate in host-tourist interactions. Arguably, growth in tourism does little to lessen the impacts of these differences, and can only contribute to the broadening spectrum of tourist and host experiences. That beach use for example is fundamentally different between these social groups should set the precedent for understanding these differences (empirical analysis showed that the beach activities of residents were primarily land-based while tourist activities were predominantly water-based).

A typology of the tourist sample was also derived using the cluster analysis techniques described above. The same variables were used as in the resident survey (see Table 3) but frequency of visits to beaches was replaced with number of visits to the island in order to remove the bias towards beach visits (tourists indicated that beaches were one of the primary motivations for visiting Barbados). The results of this analysis are discussed below.

4.3.1 Trends in Tourist Perceptions

The inter-group variability of the 3 tourist clusters is depicted in Table 5. The distance between these three clusters is comparatively small. Hence there is some similarity between the groups.
Table 5: Distances between Final Cluster Centres for the Tourist Sample

<table>
<thead>
<tr>
<th>Cluster</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>4.415</td>
<td>3.242</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>4.415</td>
<td></td>
<td>4.696</td>
</tr>
<tr>
<td>H</td>
<td>3.242</td>
<td>4.696</td>
<td></td>
</tr>
<tr>
<td>Total (N)</td>
<td>38</td>
<td>14</td>
<td>50</td>
</tr>
</tbody>
</table>

Moreover, the central tendencies of responses for each cluster reveal overlapping characteristics in the three clusters:

- Respondents are not first-time visitors to the island. It is anticipated therefore that their assessments would be more informed because of their ability to compare the changes that may have occurred over their visits. Indeed, Williamson and Hirsch (1996, cited in Green, 2005) commented that individuals who are highly familiar with a location are often aware of any social and environmental problems because they have witnessed their evolution over time.

- All clusters consider the beaches to be very important to the economy of Barbados (which is consistent with their motivations for visiting the country).

- Surprisingly, members of each cluster share the opinion that economic growth should be prioritised even if the environment suffers a little. This is an important observation as it was assumed that environmental quality would be considered as a key element in final destination choice for tourists. It also confirms the dominance of the pro-development group even though the proportion of tourists who are pro-development versus those who are pro-environment is 1:3 in favour of those who are pro-environment (for the resident sample this proportion is 1:1). Moreover, empirical analysis revealed that three times as many tourists favour trade-offs as are pro-development, but there is no differentiation between those who are pro-environment and those who favour trade-offs. This trend is likely to be fundamental to the developmental focus of the country and is representative of the dichotomies that can arise from the aspirations of the host country and the preferences of tourists.

- Cluster members are neutral in their support of Government in the management of funds allocated for beach improvement.

4.3.2 Cluster F: The Content

Cluster members recorded an average of two visits to the island and consider beaches as very important to the economy. Members believe that residents and tourists benefit equally from tourism and therefore believe that economic growth should be prioritised. No social and physical changes resulting from tourism development are predicted, except for congestion levels and the destruction of coral reefs: members believe that the congestion levels at beaches would increase slightly and that there would be a small decrease in coral reef damage. The reason for these negligible effects may be attributed to the belief that beaches are fairly adequately protected from tourism impacts. Members are however personally affected by the impacts on beaches and believe that future generations would also be affected. As a result there is a general willingness to pay for beach access, but this willingness to pay is dependent on the entry fee imposed. These characteristics testify to the generally contented nature of group members.
Forty-two percent of the respondents are male. The average age of cluster members is 40 years and the average individual had acquired A’Levels or equivalent qualifications as the highest education level achieved. Most members are in full-time employment (36%) and originate from North America (71%). The average household income of the cluster is BD$137,500/year.

4.3.3 Cluster G: The Carefree
On average The Carefree made 3 visits to the island. Of the 14 people that comprise this group, 3 were men and 7 were women (there were 4 missing values for gender). The majority of members possesses a college degree or equivalent and were in full-time employment. The average age was 40 years; group members had an average household income of BD$167,500, and were mostly from North America (57%).

Respondents consider beaches to be very important to the economy of Barbados but consider them to be hardly protected from the negative impacts of tourism. As a result, they believe that increased tourism activity would cause small increases in coral reef destruction, beach erosion and environmental damage, while incidences of marine water pollution are expected to decrease slightly. Despite these sentiments, members are unaffected by the impacts on beaches and do not believe that future generations will be affected. Their belief that most of the economic benefits from tourism would accrue to non-nationals may explain their support for economic growth at the expense of environmental protection; their prediction that no changes would be observed for the cost of real estate; and their willingness to pay a fee for access to the beach (their willingness to pay is however dependent on the size of the fee). They also have a positive outlook on the social impacts of increased tourism. Thus, access to beaches and antisocial behaviour are expected to remain the same while congestion levels are predicted to decrease slightly. These trends suggest that members are indifferent and are perhaps more concerned with enjoying the tourist experience in Barbados. As a result they are described as carefree.

4.3.4 Cluster H: The Contrary
Fifty respondents comprise this cluster of which 45% are male. Members visited the island an average of three times. The average age is 40 years and most members had attained a college degree or equivalent as their highest level of education. Most respondents are in full-time employment (61%) and from North America (61%). The average household income for the group is BD$122,500/year.

Cluster members believe that residents derive most of the economic benefits of tourism. The importance of beaches to the economy of Barbados is recognised and beaches are considered to be fairly adequately protected from the negative impacts of tourism. This opinion appears to be linked with respondents’ willingness to pay for beach entry being dependent on the improvements that would be made. Members also believe that tourism development would cause large increases in the congestion levels at beaches, and small increases in the incidence of antisocial behaviour. In addition, slight increases are predicted for all the environmental impacts of tourism development while the social impacts are expected to remain unchanged. Respondents consider beaches to be very important to the economy of Barbados, but the predicted negative environmental impacts from tourism development may be associated with views that economic growth should be prioritised even if the environment suffers a little. This pro-economy stance does not appear to justify their belief that real estate prices will remain unchanged (they were
therefore described as being contrary). Cluster members are neutral in their belief that the impacts on beaches affects them personally but do believe that future generations would be affected.

4.4 Valuing Environmental Changes at the Folkestone Marine Reserve using Choice Modeling

A total of 389 usable questionnaires were collected at the end of the sampling period and consisted of 223 completed resident and 166 tourist questionnaires. After omitting non-responses, 212 resident surveys and 163 tourist surveys were usable. The sample sizes are small and as a result, one important caveat should be noted. As will be discussed, the wide confidence intervals of the WTP estimates are attributed to the small size of the samples. Though a larger sample size is preferable, inferences can still be made from the survey responses and models of such but with the understanding that the inferences are indicative of the characteristics of the samples rather than conclusive. This means that the magnitude of the WTP values for each of the FMR attributes tested should be regarded as approximate. Hence the conclusions drawn from the regression analyses are ‘qualitative’ on the basis of their statistical significance and the relative size of the coefficients instead of their absolute size.

The Random Utility Theory (RUT) is used to investigate the effects of selected predictor variables on choice behaviour and WTP. Briefly, the underlying principle of the RUT is that consumers derive varying levels of utility from the same set of attributes of a good. A consumer will ultimately select that good from which s/he can derive the greatest utility. This utility will also be influenced by exogenous factors such as budget, income, and the prices of market goods (Freeman, 1993; Hanley et al., 1998). According to the theory, the utility (U) of a good cannot be observed but it is assumed to consist of a systematic (deterministic) component (V) which is an indirect utility function of the good’s attributes and the characteristics of the individual; and a random error term. The observable and unobservable (random) components of utility were represented in Equation 1.

\[
U_{jk} = V_{jk} + \epsilon_{jk}
\]  

(1)

Where:
- \(U_{jk}\): The latent (unobservable) utility that consumer \(j\) derives from choice alternative \(k\);
- \(V_{jk}\): The observable/explainable/deterministic component of latent utility that consumer \(j\) derives from choice alternative \(k\);
- \(\epsilon_{jk}\): The random/unexplainable/stochastic component of latent utility derived from the \(jk\) relationship

The probability that alternative \(k\) will be preferred over alternative \(m\) is represented by the utility function in Equation 2:

\[
P(\frac{j}{C_k}) = P\left(\left(V_{jk} - V_{jm}\right) + \left(\epsilon_{jk} - \epsilon_{jm}\right)\right) > 0
\]  

(2)

for all options \(k\) in choice set \(C_k\)

The probability of choice expression above states that the probability of consumer \(j\) choosing option \(k\) in preference to option \(m\) from choice set \(C\) can be expressed as the probability that the
utility associated with option $k$ exceeds that associated with all other options. The estimation of choice probabilities is via the conditional (multinomial) logit model (Equation 3) which is estimated by conventional maximum likelihood procedures.

$$P(j/C_h) = \frac{e^{\mu V_{j}}}{\sum_{k} e^{\mu V_{k}}}$$

(3)

Where:
- $V$: The direct utility function
- $\mu$: Scale parameter which captures the ratio of the utilities. It is impossible to identify $\mu$ in a single data set and it is therefore assumed to be equal to 1.

### 4.4.1 Basic Model: Dummy Variable Specification

The basic model is estimated with the attributes coded as categorical variables. The use of dummy variables to describe these attributes therefore provide a more insightful analysis of the choice models since the attributes under consideration are qualitative. In this way, models were estimated where the dummy variables represented $N-1$ of the attribute levels and the model defined with an omitted level from each attribute in order to avoid perfect linear dependence in the attributes. This omitted level represented the base level from which the estimated model parameters reflect the differences in choice probabilities between the base level and the attribute levels specified in the models.

The ‘Sewage treatment’, ‘Facilities/Information’, and ‘Watersports zoning’ attributes were each represented by dummy variables. The dummy variables for the ‘Sewage treatment’ attribute indicated whether the attribute appeared at its medium (‘sew_mod’) or highest (‘sew_high’) level. For practical purposes an additional dummy variable (‘sew_cur’) was included to represent the current condition (status quo) and is the base level mentioned above. This was done so as to conform to the principles of welfare (utility) theory by giving respondents the option not to choose (i.e. to leave things as they are). By setting the coefficient for this base level in the resulting models as zero, a positive coefficient for the other levels related to the attribute would indicate a preference over the base situation and an increased probability of choosing the option in which the particular attribute level features. A negative coefficient on the other hand, would indicate a preference for not having the particular change implemented (or a reduced WTP for the change). Similar dummy variables represented the ‘Facilities/information’ and ‘Watersports zoning’ attributes. Note that for the watersports zoning attribute the current condition is the base level as the intention is to determine utility changes from the current condition for hypothetical changes in the attribute. A description of the variables and codes used in the dummy variable specification is presented in Table 6.

### 4.4.2 Model Estimates of the Basic Dummy Variable Specification

The model estimates of the basic dummy variable specifications for residents and tourists are presented in Table 7. The chi-squared statistics for the two specifications enable one to reject the null hypothesis, at the 95% confidence level, that none of the variables in the model are significant determinants of choice. The models are therefore highly significant but the pseudo-$R^2$, which captures the measure of fit, is low (3% and 8% for the resident and tourist model

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4 See Carson et al. (1994) for a discussion of the use of the status quo in valuation exercises.
respectively). The resulting coefficients for the attribute ranges capture the marginal utility individuals derived from changes in these attributes from the base level.

Higher coefficients/WTP estimates are expected in the model specification for larger changes in the attributes. These larger coefficients reflect a higher effect on utility for the attribute change. For example, since high sewage treatment is in principle better than moderate treatment, it is assumed that the provision of high sewage treatment would confer the greater positive utility and WTP on individuals. Similarly, the provision of more public facilities and signposts is assumed to confer greater positive utility on respondents than the provision of signposts alone. A priori interpretation suggests that individuals are expected to derive a positive utility from the exclusion of watercrafts from the recreational zone, and a negative utility from the expansion of the watersports zone. These effects are analysed in Table 7, which shows that the coefficient signs are largely as expected for the sewage treatment and facilities/information attributes and are consistent across samples.

### Table 6: Variables and Codes used in the Dummy Variable Specification Model

<table>
<thead>
<tr>
<th>Attribute used in Linear Model</th>
<th>Levels</th>
<th>Coding of Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage Treatment</td>
<td>Sew_cur</td>
<td>1: No change from current situation. 0: Otherwise</td>
</tr>
<tr>
<td></td>
<td>Sew_mod</td>
<td>1: Most sewage treated to moderate quality. Suitable for irrigation. 0: Otherwise</td>
</tr>
<tr>
<td></td>
<td>Sew_hi</td>
<td>1: Most sewage is treated to high quality. Suitable for bathing. 0: Otherwise</td>
</tr>
<tr>
<td>Facilities/Information</td>
<td>Fac_cur</td>
<td>1: No change from current situation. 0: Otherwise</td>
</tr>
<tr>
<td></td>
<td>Fac_med</td>
<td>1: Signposts showing zones and user information. 0: Otherwise</td>
</tr>
<tr>
<td></td>
<td>Fac_ful</td>
<td>1: More public showers/toilets. Signposts showing zones and user information. 0: otherwise</td>
</tr>
<tr>
<td>Watersports Zoning</td>
<td>Wat_cur</td>
<td>1: No change from current situation. 0: Otherwise</td>
</tr>
<tr>
<td></td>
<td>Wat_exc</td>
<td>1: Total exclusion of watercrafts from recreational zone. 0: Otherwise</td>
</tr>
<tr>
<td></td>
<td>Wat_exp</td>
<td>1: Recreational zone reduced. Expansion of watersports zone. 0: Otherwise</td>
</tr>
<tr>
<td>Price (Residents) (BDS/household/year)</td>
<td>n/a</td>
<td>$9  $15  $20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$37 $48  $70</td>
</tr>
<tr>
<td>Price (Tourists) (BDS/tourist/visit)</td>
<td>n/a</td>
<td>$15 $25 $43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$60 $74 $100</td>
</tr>
</tbody>
</table>

n/a: not applicable
### Table 7: Model Estimates of Dummy Variable Specification for Residents and Tourists

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Residents</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>z-statistic</td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>z-statistic</td>
<td>Coefficient</td>
<td>Std. Error</td>
</tr>
<tr>
<td><strong>Sewage Treatment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew_mod</td>
<td>0.8067</td>
<td>0.1345</td>
<td>6.00</td>
<td>0.6037</td>
<td>0.1347</td>
<td>4.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew_hi</td>
<td>0.7610</td>
<td>0.1673</td>
<td>4.55</td>
<td>0.6190</td>
<td>0.1826</td>
<td>3.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Facilities/Information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fac_med</td>
<td>0.0798</td>
<td>0.1211</td>
<td>0.66</td>
<td>0.5848</td>
<td>0.1323</td>
<td>4.42</td>
<td></td>
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</tr>
<tr>
<td>Fac_ful</td>
<td>0.3809</td>
<td>0.1245</td>
<td>3.06</td>
<td>0.2404</td>
<td>0.1446</td>
<td>1.66</td>
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</tr>
<tr>
<td><strong>Watersports Zoning</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Wat_exc</td>
<td>-0.4212</td>
<td>0.1378</td>
<td>-3.06</td>
<td>0.4285</td>
<td>0.1518</td>
<td>2.82</td>
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<tr>
<td>Wat_exp</td>
<td>-0.6620</td>
<td>0.1220</td>
<td>-5.43</td>
<td>0.1829</td>
<td>0.1265</td>
<td>1.45</td>
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<tr>
<td><strong>Price</strong></td>
<td>-0.0114</td>
<td>0.0038</td>
<td>-2.97</td>
<td>-0.0070</td>
<td>0.0032</td>
<td>-2.17</td>
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<tr>
<td><strong>Willingness-to-Pay:</strong></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Residents (BDS/household/year)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tourists (BDS/tourist/visit)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Attribute</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>WTP (s.e)</td>
<td>95% Confidence Interval</td>
<td>WTP (s.e)</td>
<td>95% Confidence Interval</td>
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<tr>
<td></td>
<td>Upper</td>
<td>Lower</td>
<td></td>
<td>Upper</td>
<td>Lower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sewage Treatment</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew_mod</td>
<td>$70.73</td>
<td>$16.58</td>
<td>$124.89</td>
<td>$85.97</td>
<td>-$3.04</td>
<td>$174.97</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(27.63)</td>
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<td></td>
<td>(45.41)</td>
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<tr>
<td>Sew_hi</td>
<td>$66.72</td>
<td>$32.19</td>
<td>$101.26</td>
<td>$88.15</td>
<td>$30.70</td>
<td>$145.60</td>
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</tr>
<tr>
<td></td>
<td>(17.62)</td>
<td></td>
<td></td>
<td>(29.31)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Facilities/Information</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fac_med</td>
<td>$07.00</td>
<td>-$12.89</td>
<td>$26.89</td>
<td>$83.27</td>
<td>$15.80</td>
<td>150.75</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(10.15)</td>
<td></td>
<td></td>
<td>(34.43)</td>
<td></td>
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</tr>
<tr>
<td>Fac_ful</td>
<td>$33.40</td>
<td>$9.91</td>
<td>$56.88</td>
<td>$34.23</td>
<td>-$1.23</td>
<td>$69.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(11.98)</td>
<td></td>
<td></td>
<td>(18.09)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Watersports Zoning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wat_exc</td>
<td>-$36.93</td>
<td>-$78.03</td>
<td>$4.17</td>
<td>$61.02</td>
<td>$14.03</td>
<td>$108.02</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(20.97)</td>
<td></td>
<td></td>
<td>(23.98)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wat_exp</td>
<td>-$58.04</td>
<td>-$99.78</td>
<td>-$16.30</td>
<td>$26.04</td>
<td>-$15.96</td>
<td>$68.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(21.30)</td>
<td></td>
<td></td>
<td>(21.43)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Residents: Sample size= 212; No. observations: 4068; Log-likelihood: -1442.2739; $\chi^2 (7)$: 94.89; pseudo-$R^2$: 0.0318

Tourists: Sample size= 163; No. of observations: 3165; Log-likelihood: -1070.0251; $\chi^2 (7)$: 178.02; pseudo-$R^2$: 0.0768

The coefficients for the sewage treatment levels (*i.e. sew_mod and sew_hi*) are positive and significant. Hence the probability of choosing the option generally increases if improvements in sewage treatment are included. The coefficient sizes and WTP estimates for the sewage treatment levels however indicate that moderate sewage treatment is preferred over high treatment for the resident sample. This is counterintuitive and suggests that residents may have had some difficulty in differentiating between moderate and high sewage treatment. This implies
scope insensitivity with respect to the sewage treatment attribute. Scope insensitivity was not evident in the tourist sample as there was a preference for high over moderate sewage treatment.

The coefficients for the facilities/information attribute are positive but only \(\text{fac\_ful}\) is statistically significant in the resident model. This suggests that residents had a positive preference and WTP for the provision of user information and public facilities. Empirical analysis shows that that less than half the resident sample (44\%) was satisfied with the quality of the public facilities. It is therefore not surprising that given its significantly positive coefficient the higher level of the facilities/information attribute influences the final choices of residents. The provision of user information only (\(\text{fac\_med}\)) is not statistically significant—suggesting that residents’ preferences for the management changes are unaffected by this variable.

For tourists both levels of the facilities/information attribute are positive and significant and therefore influence their final choices. However, the coefficient of \(\text{fac\_ful}\) is not higher than \(\text{fac\_med}\) as should be, which is indicative of scope insensitivity. These results are consistent with their satisfaction with the quality of the public facilities within the FMR. Note that \(\text{fac\_ful}\) is significant only at the 10\% level and is perhaps fuelled by the fact that individuals are satisfied with the facilities within the FMR.

The results in Table 7 for the resident sample show that a negative utility is derived in moving from the current condition to an exclusion of watercrafts. The effect on utility from the expansion of the watersports zone is negative and therefore consistent. The size of the coefficients for the watersports attribute also indicates that the expansion of the watersports zone would impose a greater disutility than total exclusion of watercrafts from the recreational zone. Interestingly, residents’ preference for the current condition over the expansion of the watersports zone or the exclusion of watercrafts may be reflective of altruistic behaviour. One possible reason for altruism among residents is their reluctance to affect the livelihood of watercraft operators within the FMR but this could not be confirmed. The preferences among tourists are however different and more consistent with the linear model since tourists derive a positive utility from the total exclusion of watercrafts from the recreational zone. Moreover, the expansion of the watersports zone (\(\text{wat\_exp}\)) does not affect their choice of the proposed management option. Tourists’ preference for the exclusion of watercrafts may be explained by the results which highlight their low participation in watersports activities within the FMR.

### 4.4.3 Willingness-to-Pay (Implicit Prices)

For residents, the implicit price for a change from the current condition to sewage that is moderately treated can be calculated using the formula in Equation 4:

\[
\text{IP}_{\text{sew\_mod}} = \beta_{\text{sew\_mod}} - \beta_{\text{price}} = \left( -0.0114 \right) = $70.73
\]  

Similarly, the implicit price for sewage treatment to high quality (suitable for bathing) is:

\[
\text{IP}_{\text{sew\_hi}} = \beta_{\text{sew\_hi}} - \beta_{\text{price}} = \left( 0.8067 \right) = $66.72
\]
As discussed, the higher WTP for moderate sewage treatment is counterintuitive as it implies that WTP to move from the current (base) level to moderate sewage treatment is positive, while WTP to move from moderate to high sewage treatment is negative (Figure 1 illustrates). As mentioned this behaviour may be indicative of scope insensitivity among residents, though the overlapping confidence intervals suggests that the difference in WTP is not statistically significant.

**Figure 1: Illustration of Residents’ Negative WTP for High Sewage Treatment**

Note that the widths of the confidence intervals for the WTP estimates (in Table 7) are large and overlap for the attributes. It appears that the wide confidence interval may have resulted from a sample size that was not large enough. Harzing (2000) suggested that low response rates might lead to samples that are too small for conclusions to be made. It is therefore highly likely that WTP estimates in subsequent analyses would also have wide confidence intervals, which—for the reasons outlined above—would imply no statistically significant difference when WTP estimates are compared. Precision should however improve with a larger sample. Alas, the effects of small sample size are expected to heighten in later analyses when the samples become progressively small when treated for methodological sensitivities (e.g. protest bids, preference certainty).

The implicit prices of the other attributes are presented in Table 7. With respect to the watersports zoning attribute, residents are willing to pay BD$36.93/household/year to remain at the current condition if the exclusion of the watersports from the recreational zone is proposed. In other words they are willing to pay BDS$36.93/household/year to avoid the costs associated with excluding watersports from the recreational zone. A negative WTP estimate may be interpreted as a ‘WTP to avoid’ or a ‘WTA compensation to put up with’ a change. Note that theoretically, these are two different Hicksian welfare measures and may not be exactly the same—WTP to avoid a change can be described as equivalent variation; while WTA compensation to put up with a change is compensating variation. The negative WTP estimates in this report are interpreted as ‘WTP to avoid the change'.
Similarly, BD$58.04/household/year is the WTP to remain at the current condition if the option of expanding the watersports zone (with a reduction in the recreational zone) is proposed. An implied ranking of the attributes in terms of importance to the sample can be derived from the WTP estimates. Moderate sewage treatment is the highest ranked attribute, and the lowest ranked attribute is provision of user information and public facilities.

Though scope insensitivity was not observed for sewage treatment among the tourist sample, tourists are willing to pay a very low value for the additional level of sewage treatment (BD$88.15/tourist/visit for high sewage treatment versus BD$85.97/tourist/visit for moderate sewage treatment) but the estimated WTP for moderate treatment is not statistically significant. The overlapping confidence intervals however suggest that residents’ and tourists’ WTP for high sewage treatment is not significantly different. An implied ranking of the attributes in terms of importance to the tourist sample indicates that high sewage treatment is the most important and the least important is the expansion of the watersports zone.

**4.5 Policy Support and Total Welfare Measures**

In this section an analysis will be conducted thus far to estimate the total welfare measure arising from a combination of changes from the current condition. This is another advantage of the CM method from a policy planning point of view, since models can be derived from different attribute combinations to value a range of improvement scenarios for the FMR. In principle, tourism managers and planners can utilise the public support and total welfare measures derived from these scenarios to determine which scenario would have the greatest net benefit to the community. Calculation of total welfare measures and determination of the level of policy support for proposed environmental changes are discussed in the following sections.

**4.5.1 Total Welfare**

Total welfare is derived by specifying a model in which the attributes of the scenario vary and then comparing the total utility and overall WTP for a change from the current condition (*i.e.* the compensating surplus for the environmental quality change\(^5\)). Accordingly, the welfare measures for 4 alternative scenarios were calculated. The beach scenarios were:

\(^5\) Compensating Surplus is defined as the amount of money that would keep the individual at the original level of utility with the change.
(1) Most sewage is treated to low quality. Some is then used for irrigation or discharged to sea. (2) There is one facility with public toilets/showers. (3) There are two watersports zones, one scientific zone, and one recreational zone. All watercrafts can enter the recreational zone but speed restrictions apply.

**Current Condition**

**Scenario 1**  
*(Beach A)*  
(1) Most sewage is treated to high quality. Suitable for bathing. (2) More public showers/toilets; signposts showing zones and user information. (3) Total exclusion of watercrafts from the recreational zone.

**Scenario 2**  
*(Beach B)*  
(1) Most sewage is treated to high quality. Suitable for bathing. (2) More public showers/toilets; signposts showing zones and user information. (3) All watercrafts can enter the recreational zone but speed restrictions apply (current condition).

**Scenario 3**  
*(Beach C)*  
(1) Most sewage is treated to high quality. Suitable for bathing. (2) Signposts showing zones and user information. (3) Total exclusion of watercrafts from the recreational zone.

**Scenario 4**  
*(Beach D)*  
(1) Most sewage is treated to low quality; some is then used for irrigation or discharged to sea (current condition). (2) Signposts showing zones and user information. (3) All watercrafts can enter the recreational zone but speed restrictions apply (current condition).

The rationale for selecting the aforementioned scenarios is as follows: Beach A is the proposal presented in the CV question. Its inclusion here serves to compare the welfare estimates derived from the CV and CM exercise. Beach B (the ‘resident maximum’) and Beach C (the ‘tourist maximum’) are such that they respectively are believed to maximise residents’ and tourists’ welfare based on inferences from the most preferred models. In the same vein, these behavioural models also set the foundation for the creation of a beach scenario that is assumed to maximise joint welfare. Beach B, it is believed, achieves this purpose and is also referred to as the ‘joint maximum’. Note that in this scenario the current condition for the Watersports Zoning attribute is maintained because of the opposing preferences of residents and tourists. In addition, it is anticipated that the higher level of the Facilities/Information attribute would appease both residents and tourists. Beach D, on the other hand, proposes a scenario that does not appear to maximise welfare and should therefore be avoided.

Estimates of compensating surplus are calculated using the formula in Equation 6.

$$CS = \frac{-1}{\beta_M}(V_C - V_N)$$  

(6)

$\beta_M$: the marginal utility of income (assumed to be equal to the coefficient for the Price attribute)  
$V_C$: the utility of the current condition  
$V_N$: the utility of the new option (i.e. scenario 1, 2, 3 or 4)

According to Equation 6, the utility associated with the new option ($V_N$) is subtracted from the utility associated with current condition ($V_C$). Under the most preferred models (in which protest bids, uncertain choices and inconsistent responses are removed), utility is calculated by substituting the model coefficients for the attribute levels in the new scenario and dividing by the price coefficient, which is equivalent to the marginal utility of income (the absence of markets in
which environmental goods can be traded prevents the use of income in Equation 6. The income coefficient is therefore replaced with the price coefficient which reflects the ability to pay for the good(s) in question). For ease of reference the utilities for the MPM for the resident and tourist sample are presented in Table 8. Since qualitative variables are used, dummy variables represent the attribute levels in the model specifications. As a result the utility of the current condition \( V_C \) is zero as there is no utility associated with the dummy variable zero level. Hence, no subtraction is needed from the current condition in this case because the coefficient for all attributes under the current conditions is zero.

### Table 8: The Most Preferred Model (Residents and Tourists)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Residents</th>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>z-statistic</td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>z-statistic</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sewage Treatment</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew_mod</td>
<td>0.9443</td>
<td>0.1343</td>
<td>7.03</td>
<td>0.6558</td>
<td>0.1383</td>
<td>4.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew_hi</td>
<td>0.9926</td>
<td>0.1709</td>
<td>5.81</td>
<td>0.7283</td>
<td>0.1895</td>
<td>3.84</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Facilities/Information</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fac_med</td>
<td>0.3387</td>
<td>0.1236</td>
<td>2.74</td>
<td>0.7868</td>
<td>0.1378</td>
<td>5.71</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fac_ful</td>
<td>0.6746</td>
<td>0.1291</td>
<td>5.23</td>
<td>0.4142</td>
<td>0.1500</td>
<td>2.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Watersports Zoning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wat_exc</td>
<td>-0.1181</td>
<td>0.1466</td>
<td>-0.81</td>
<td>0.6128</td>
<td>0.1591</td>
<td>3.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wat_exp</td>
<td>-0.4363</td>
<td>0.1265</td>
<td>-3.45</td>
<td>0.3100</td>
<td>0.1319</td>
<td>2.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>-0.0148</td>
<td>0.0041</td>
<td>-3.58</td>
<td>-0.0082</td>
<td>0.0034</td>
<td>-2.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Residents:** Sample size = 187; No. observations: 3546; Log-likelihood: -1196.7818; \( \chi^2 (7): 203.56; \) pseudo-R\(^2\): 0.0784

**Tourists:** Sample size = 153; No. of observations: 2982; Log-likelihood: -961.5976; \( \chi^2 (7): 260.85; \) pseudo-R\(^2\): 0.1194

Given the above, the compensating surplus for Beach A (Scenario 1) is calculated as follows:

\[
CS = -\frac{0.9926 + 0.6746 + (-0.1181)}{-0.0148} = 104.67
\]

Equation 7 therefore suggests that the total welfare that accrues to each resident household for a change from the current condition to scenario 1 (Beach A) is BD$104.67. The compensating surplus for the alternative beach scenarios is presented in Table 9.
Table 9: Estimates of Compensating Surplus for the Various Beach Scenarios (MPM)

<table>
<thead>
<tr>
<th>Beach Attribute</th>
<th>Beach A (CV / CM Comparison)</th>
<th>Beach B (‘Resident Maximum’ / ‘Joint Maximum’)</th>
<th>Beach C (‘Tourist Maximum’)</th>
<th>Beach D (Avoid)</th>
<th>Sewage Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most sewage is treated to high quality. Suitable for bathing.</td>
<td>Most sewage is treated to high quality. Suitable for bathing.</td>
<td>Most sewage is treated to high quality. Suitable for bathing.</td>
<td>Most sewage is treated to low quality. Some is then used for irrigation or discharged to sea (current condition).</td>
<td></td>
</tr>
<tr>
<td>Facilities/Information</td>
<td>More public showers/toilets; signposts showing zones and user information.</td>
<td>More public showers/toilets; signposts showing zones and user information.</td>
<td>Signposts showing zones and user information.</td>
<td>Signposts showing zones and user information.</td>
<td></td>
</tr>
<tr>
<td>Watersports Zoning</td>
<td>Total exclusion of watercrafts from the recreational zone.</td>
<td>All watercrafts can enter the recreational zone but speed restrictions apply (current condition).</td>
<td>Total exclusion of watercrafts from the recreational zone.</td>
<td>All watercrafts can enter the recreational zone but speed restrictions apply (current condition).</td>
<td></td>
</tr>
<tr>
<td>Total Welfare (Residents) 95% confidence interval z-statistic</td>
<td>$104.77 ($75.32 — $134.23) 6.97</td>
<td>$112.76 ($69.27 — $156.24) 5.08</td>
<td>$82.06 ($60.00 — $104.11) 7.29</td>
<td>$22.91 ($5.96 — $39.85) 5.89</td>
<td></td>
</tr>
<tr>
<td>Market Share (%)</td>
<td>65%</td>
<td>70%</td>
<td>51%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>Total Welfare (Tourists) 95% Confidence interval z-statistic</td>
<td>$214.68 ($108.83 — $320.53) 3.98</td>
<td>$139.73 ($68.53 — $210.93) 3.85</td>
<td>$260.26 ($114.52 — $407.00) 3.50</td>
<td>$96.23 ($27.08 — $165.38) 3.22</td>
<td></td>
</tr>
<tr>
<td>Market Share (%)</td>
<td>50%</td>
<td>33%</td>
<td>61%</td>
<td>22%</td>
<td></td>
</tr>
</tbody>
</table>
4.5.2 Policy Support Measures (Market Share)

Bennett and Blamey (2001) indicated in their studies that choice modelling results can be used to predict the relative support that respondents could give to various scenarios. This capability is particularly useful in further assisting policy makers in predicting public support (i.e. ‘the market share’) that would be generated by a particular scenario or alternative. The market share is therefore the proportion of the sample that is expected to support the proposed changes associated with a particular option. It is calculated by dividing the utilities of the attributes that make up the scenario by the total utilities for the average respondent. Hence under the RRM_xP for the resident sample the market share (MS) of Beach A is calculated as:

\[
MS_{Beach \, A} = \left[ \frac{\beta_{\text{sew. hi}} + \beta_{\text{fac. ful}} + \beta_{\text{wat. exc}}}{\beta_{\text{sew. mod}} + \beta_{\text{sew. hi}} + \beta_{\text{fac. med}} + \beta_{\text{fac. ful}} + \beta_{\text{wat. exc}} + \beta_{\text{wat. exp}} + \beta_{\text{price}}} \right] \times 100
\]

\[
= \left[ \frac{0.9926 + 0.6746 + (-0.1181)}{0.9443 + 0.9926 + 0.3387 + 0.6746 + (-0.1181) + (-0.4363) + (-0.0148)} \right] \times 100
\]

\[
= \left( \frac{1.5491}{2.3810} \right) \times 100
\]

\[
MS_{Beach \, A} = 65\%
\]

Table 9 presents the market shares of the 4 proposed beach scenarios for the resident and tourist sample.

4.6 Summary of Key Points

The total welfare estimates and market share values in Table 8 show that the highest welfare derived from the beach scenarios correspond with the predicted ‘resident maximum’ and ‘tourist maximum’. From a policy implementation standpoint, one could argue for the implementation of Beach A since it appears to be the one that generates the maximum joint welfare—rather than Scenario 2 (Beach B) as envisaged. That Beach A is highly favoured among residents and tourists in terms of the relative welfare measures and market shares, and speaks to the theoretical validity of the analysis since this scenario is in principle the best scenario in terms of providing the highest level of the attribute changes.

The analysis showed that policy makers should avoid policies/proposals that minimise welfare. Beach D should be avoided because it decreases residents’ welfare approximately 5-fold relative to the ‘resident maximum’ and reduces tourists’ welfare 3-fold relative to the ‘tourist maximum’. Relative to Beach A (the new ‘joint maximum’), Beach D is likely to impose a 5-fold and 2-fold decrease in welfare for residents and tourists, respectively.
5.0 DISCUSSION AND CONCLUSION

5.1 Policy Implications of Tourism Growth and Environmental Change

The empirical results are encouraging because they provide planners with a foundation from which practical solutions to the current management issues related to the FMR can be devised. The positive utilities and the significance of the model parameters confirm that, with adequate sample sizes, stated preference approaches can be successfully applied in Barbados.

Within the context of the current research it can be inferred that any profitability to be gained from tourism would be associated with the environmental assets of Barbados since it is on these that the industry has traditionally relied. The reality is that with poorly maintained environmental resources and/or ill-conceived resource management programmes, profitability (and more importantly, sustainability) cannot be realised. Hence for the beaches of the FMR there needs to be a clearly defined programme of action that outlines the immediate needs for management of environmental change and/or the preservation of environmental quality. One application of the stated preference results is in securing funding for protecting the resources or environmental assets (e.g. reefs) within the FMR, and enhancing the environmental quality of the same, since the recreational benefits, as part of the overall value of the FMR, are expected to increase as the quality of the FMR increases. Financing for remediation and management projects can be sourced from private and public contributions. Public funding may be realised by involving the community in the management programme and can be supplemented by diverting some of the budgetary allocations from the sunken costs of marketing. Management should in turn be as transparent as possible so as to ensure public confidence in proposed policies. Private funding in the form of corporate sponsorship or investment is one vehicle of promoting participation but local authorities must approach the concept of investment in public assets in a decisive manner since issues are likely to emerge over the ownership of the resource; the legal framework for investment/sponsorship; criteria used to prioritise and list projects for funding; and methods of monitoring the progress of a project (Simpson, 1994).

As Table 10 shows, some Caribbean islands have imposed various fees to assist in the management of marine parks. This is an attractive option but implementing direct (on-site payment) is difficult in Barbados because of (i) the existing legislative framework that guarantees free access to beaches for all residents; and (ii) the physical hindrances to implementation since it is difficult to police the diffuse entry points to beaches within the Reserve. These hindrances may result in the net benefits from imposing such fees being zero or negative especially if in an effort to avoid payment, users take alternative, more environmentally damaging routes to the resource.

The introduction of environmental levies to residents and tourists can however facilitate the recovery of money for environmental conservation and/or protection. Not to be excluded are the operators of party cruisers and dive operators who, to the best of the researcher’s knowledge, have been exempt from any form of environmental levy although they have exploited the amenity values of the FMR for commercial interests. Forsyth et al. (1995:271) support the imposition of levies/taxes by arguing that tourists should pay fully for the costs of the goods and services consumed if the destination is expected to yield net tourism benefits. This is because the
use of public goods (e.g. beaches, roads, national parks, etc.) by tourists can create negative outcomes (e.g. congestion or pollution) which reduce the value of a resource to other users. These arguments also apply when citizens who are domestic tourists impose unpaid-for costs on other citizens and reduce (and possibly negate) the benefits the latter would derive from visiting the resource. Moreover Green and Donnelly (2003, cited by Depondt and Green, 2006) commented that the capacity to generate user fees for SCUBA diving in marine protected areas has not been fully exploited in the Caribbean. In many instances the fees for the use of resources within marine protected areas have been set below what tourists are actually willing to pay (Depondt and Green, 2006). A useful example is provided by the Bonaire Marine Park: Dixon et al. (1993) revealed that the average amount tourists were willing to pay in dive fees (USD27.40) was higher than the current fee of USD10.00 (see Table 10).

### Table 10: Fee Structures used in some Caribbean Islands for the Management of Parks

<table>
<thead>
<tr>
<th>Country</th>
<th>Resource</th>
<th>Payment (Fee) Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>Nelson’s Dockyard National Park</td>
<td>USD5 per person entrance fee; mooring fees for yachts</td>
</tr>
<tr>
<td>Belize</td>
<td>The Coastal Zone Management Authority and Institute (CZMAI)</td>
<td>USD2.50 per person from departure tax; USD5 (foreigner) or USD2.50 (national) entrance fee earmarked for the Protected Areas Conservation Trust (PACT)</td>
</tr>
<tr>
<td>British Virgin Islands</td>
<td>Rhone Marine Park</td>
<td>USD1 per dive; mooring permits for boats</td>
</tr>
<tr>
<td>Bonaire, Netherlands Antilles</td>
<td>Netherlands Antilles National Parks Foundation (STINAPA), Bonaire Marine Park</td>
<td>Annual admission fee of USD10 per diver per year and permit fee from dive operators</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Tortuguero National Park</td>
<td>USD7 to USD15 per person entrance fee (non-locals); USD3 per person entrance fee (citizens)</td>
</tr>
<tr>
<td>Saba, Netherlands Antilles</td>
<td>Saba Conservation Foundation, Saba Marine Park</td>
<td>Moorage/anchorage fee of USD3 per person per week; USD2 per person dive fee; USD2 per person snorkel fee</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>Soufriere Marine Management Area</td>
<td>Marine reserve dive fee of USD12 (annual) or USD4 (daily); Coral Conservation Permit for mooring: USD10 to USD25 (dependent on size of vessel and duration of stay)</td>
</tr>
</tbody>
</table>

Source: Dixon et al. (1993); Dharmaratne et al. (2000); Gustavson (2000, cited in Seenprachawong, 2002)

The valuation results are also useful from a regulatory and/or policy formulation standpoint since they can assist decision makers in weighing the costs and benefits of a programme. For example the West Coast Sewage Project involves the sewering of properties and hotels along the tourism belt, and the connection of the same to a treatment plant for the processing of waste. Several factors have stymied the start of this project; the most important of which is arguably the question of wastewater treatment and disposal. Questions therefore emerge as to whether the
The convergence of the empirical observations and inferences from these observations therefore highlighted the following: that perceptions of tourism’s impacts are not mutually exclusive, which makes the issue of support for tourism development complex; that both the positive and negative impacts of tourism should be considered; that prudent environmental management is arguably the *sine qua non* for a viable tourism product; and that concerns remain as to whether the country can absorb the environmental and socio-economic shocks associated with tourism. A tourism decision-making model similar to that in Figure 2 demonstrates that these factors are inter-related and highlight the elements that are likely to influence subsequent support for tourism development.

**KEY:**
A: Tourist-Resident Interactions  
B: Environmental Impacts  
C: Socio-economic Impacts  
D: Perceptions  
E: Behaviour (*e.g.* WTP for Environmental Changes)
Although this model provides a snapshot of possible influences and outcomes of tourism development, it re-emphasises the overarching and pervasive nature of the tourism industry and underscores the need to redirect the focus on improving public awareness of the environmental and social impacts of tourism rather than concentrating solely on the economic benefits it proffers. Note that the interactions in Figure 2 are situated within the narrow context of the tourism-induced impacts and occurrences of this research. Though the research established limited associations between attitudes and choice behaviour, a link is still maintained between ‘Perceptions’ (variable D) and ‘Behaviour’ (variable E) in deference to the academic reports—namely by Hadker et al. (1997) and Blamey (1998)—that established a relationship between the beliefs/perceptions of individuals and their WTP for environmental change. This further amplifies the notion that the behaviour of individuals is invariably contextual. The sphere enclosing the highlighted interactions represents the ‘Event Horizon’ across which other occurrences may exert influence.

Note also that the system is not static and is influenced by additional factors or External Influences (EIs) which represent the exogenous variables not captured in the analyses but which are thought to influence tourism development. Examples of EIs include the international media and the various demonstrating effects created; global events (e.g. war, economic downturns, shifting oil prices, disease); environmental shocks (e.g. hurricanes, earthquakes, climate change); global shifts in economic activity (e.g. the new focus on China’s growing economy); population shifts; different tourism stimuli (e.g. travel advisories); and political influences. EIs can therefore be transient or permanent and imply that tourism impacts and responses are still affected largely by levels of uncertainty. For example, uncertainty exists over the magnitude of environmental costs and the precise way tourism impacts the environment. These uncertainties in turn affect how environmental priorities are set. EIs might therefore contribute significantly to the observed trends in Barbados by outlining the tourist profile the country wishes to attract and dictating the direction in which the industry develops. These results reinforce the relevance of evaluating the carrying capacity of tourism development.

Using environmental and other considerations as the reason for restricting the tourism growth is however difficult to justify politically especially when the island is so reliant on this sector. Even though for tourism to be successful it will arguably depend on environmental preservation, policy makers must still grapple with the dilemma of encouraging economic development on one hand, while simultaneously restricting specific components of what is seen as one of the major arteries of growth. Uncertainty regarding the carrying capacity of the FMR is compounded by the realisation that attitudes may have greater negative impacts than say, crowding at a resource—the resource may have many users who are environmentally and socially responsible, or it may have fewer users who are indifferent. In this regard it is argued that it is not so much the volume of users at the FMR that one must be conscious of, but the attitudes and behaviours exhibited by these users.

Ironically, the Event Horizon was popularised by renowned physicist Professor Stephen Hawkings. It is defined as an invisible boundary (or ‘point of no return’) around a black hole past which nothing can escape. Hence in the context of tourism, the Event Horizon represents that invisible boundary at which external influences begin to have significant, perhaps irreversible, effects on the interactions described.
Moreover, there appears to be no meaningful attempts within local authorities to establish protocols for the measurement of carrying capacity. Rather, there are many attempts to lure more tourists as exemplified by further investments in marketing campaigns. Wilson (1996:88) hypothesised that Barbados is promoting images of ‘green’, ‘alternative’ or ‘sustainable’ tourism more as a marketing strategy to ‘augment’ existing tourism rather than as a way to either restrict visitor numbers or fundamentally alter the nature of the tourism product. Indeed one of the factors local hoteliers cited as the basis for adopting cleaner technology in their operations was to attract ‘green customers’ (Yaw, 2005). Hence a clear understanding of the antecedents of environmental change is not achieved by examining isolated events and their causes but from an understanding of all scenarios within a larger interdependent system. To discount these interdependencies detracts from a complete understanding of the performance outcomes of tourism/environmental management.

Resolving the inherent complexity in the model however becomes difficult when, despite the highlighted far-reaching consequences of tourism growth in Barbados, there is still an air of optimism that the industry can comfortably absorb the negative shocks and still continue to be regarded as highly competitive (and sustainable) in the global market—after all, Croes (2006) asserted that despite the Caribbean’s vulnerability to external shocks and natural disasters, from 1970 to 2000 it had consistently achieved a higher per capita growth than Latin America. This optimism was best expressed by one observer in Barbados commenting on the devastation caused to other Caribbean islands after the passage of Hurricane Ivan (in September 2004), and the possible negative effect on the Region’s tourist industry:

“[People] can afford to speculate [about the vulnerability of Caribbean destinations] because they don’t have any other place to go but to the Caribbean for holiday. […] As long as there are cruise lines, the Caribbean will always be attractive. Where [are tourists] going to go? Alaska? The Middle East? Asia? Africa; and be eaten?! And Blackpool [England] just isn’t cutting it!

(Anonymous, personal communication, September, 2004)

Perhaps the above illustrates a general lack of awareness of the plethora of internal and external components of tourism growth and concedes (perhaps more importantly) that tourism is unlikely to be replaced by any other industry in the near future. The sentiments above may also confirm the assertions made by Choe et al. (1997) that communities appear willing to internalise the negative effects of tourism development since there are more pressing issues to contend with—economic prosperity being one such issue. The major point this research has made however, is that distributional effects; incomplete data; and complex interactions between tourism, social networks, and the economy have contributed to the current failures in effectively managing the environmental resources within the FMR.

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7 The total budget of the Barbados Tourism Authority in 2002 was BD$52 million; BD$40 million of which was allocated to marketing (Daily Nation, Monday 15 April, 2002).
Barbados has successfully marketed itself as one of the premier tourist destinations and has used (among other things) its beaches to provide packages that meet international demand. As tourism demand increases it is imperative that Barbados maintains its environmental quality and provides a sustainable tourism product based on sound management and in-depth knowledge of resident and tourist expectations. Studies such as this can facilitate further development of the industry by informing decision makers about the characteristics of residents and tourists. Such information enables tourism planners and resource managers to harmonise the often divergent interests of stakeholders, plan new developments, predict the preferences of resource/recreation users, manage resource uses, and reduce the environmental and social costs of development.

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