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Visitor preferences and willingness to pay for coastal attributes in Barbados

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ABSTRACT

Coastal and marine resources in Barbados supply a wide range of goods and services including seafood, numerous recreation opportunities, wildlife habitat, and coastal protection. These resources also serve as the foundation of the Barbados tourism product and provide indirect economic support via employment, income, and tax revenues. Despite their obvious importance to the economy and culture of Barbados, the economic value of many aspects of coastal and marine resources have not been directly studied. An understanding of preferences and willingness to pay for coastal and marine characteristics can be useful in terms of developing efficient, cost-effective natural resource policies, particularly with regard to tourism, the principle economic driver in Barbados. This research summarizes the results of an economic valuation study aimed at understanding visitor perceptions of environmental quality, preferences for coastal amenities and willingness to pay for changes in coastal lodging attributes. Results indicate that visitors to Barbados have strong preferences for beach-front lodging and a strong aversion to beach litter. Differences in willingness to pay to avoid litter at the lower end of the litter spectrum illustrate the potential for significant economic gains to be realized through beach cleanup efforts. Tourists also display an aversion to narrow beaches, but do not seem to place much value on additional width beyond a threshold width of 8–10 m.

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1. Introduction

Travel and tourism is the second largest and fastest growing industry in the world, directly contributing 10 percent of 2014 global GDP (over US\$7.6 trillion) and employing over 277 million people (WTTC, 2015a). In terms of the relative importance of travel and tourism's total contribution to GDP, the Caribbean is the most tourism-dependent region in the world (WTTC, 2015b). The country of Barbados is no exception, ranking in the top twenty countries in the world in terms of the relative importance of travel and tourism to GDP, employment, capital investment and exports (WTTC, 2015c).

As is the case with many Caribbean destinations, tourists are drawn to Barbados by the beauty of the coastal and marine environment. It is estimated that 95 percent of tourism areas in

Barbados are located in the coastal zone (IDB, 2013) and over 70 percent of hotels are located along the coastline (Cashman et al., 2012). In spite of their importance to the economy of Barbados, coastal resources are under considerable pressures (Government of Barbados, 2010, p. 108). Anthropogenic factors such as over-fishing and coastal development (and the accompanying sedimentation and pollution) threaten to diminish the quality of coastal and marine resources, jeopardizing the viability of the tourism product. The effects of climate change in terms of land loss, beach erosion, and damage to reefs are also of particular concern as the associated impacts on tourism are expected to extend throughout the economy (Cashman et al., 2012). The challenge of coastal management in tourist destinations is to provide both protection of the natural environment and a level of sustainable development that facilitates accommodation and recreation (Semeoshenkova and Newton, 2015).

Tourism-based development in the coastal zone brings an array of market activities that often impose negative externalities on the environment. For example, the tourism industry plays a significant

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role in the amount of litter that is disbursed along coastlines with the amount of litter on beaches linked to visitor density and tourism activities (Fillmann et al., 2005). Data from the International Coastal Cleanup, collected in Barbados since 1989, shows the vast majority of marine litter (nearly 80 percent) comes from the shoreline and recreation activities of the local population and visitors. This litter includes beverage caps and lids, cups, plates, plastic utensils, bags and food containers. The presence of litter in marine and coastal areas can result in economic losses due to reductions in visitation rates and tourist spending, diminished net economic value to visitors through reduced satisfaction and opportunity costs associated with private and public spending for beach cleanup and maintenance (Ofiara and Brown, 1999; Ten Brink et al., 2009). The United Nations General Assembly formally recognized the problems associated with marine debris in 2005 with Resolution A/60/L.22 “Oceans and Law of the Sea”, which, in part, notes a lack of information and data on marine debris and calls for further examination of the scope of the effect of marine debris on the marine environment and associated economic loss (United Nations General Assembly, 2005).

Beach erosion and sea level rise have long been recognized as a social and economic concern for coastal communities, especially those vulnerable to the effects of coastal storms and dependent upon tourism. Like all coastlines, the beaches in Barbados are dynamic, with the volume of sand present at any particular beach often changing significantly over time (Fish et al., 2008). Shoreline erosion in Barbados is estimated to be occurring at a rate of 15 m per 100 years, or approximately one half-foot per year (Government of Barbados, 2010, p. 108). While much of this change is attributable to natural causes, increased density of coastal development, combined with the destruction of reef habitat from long term pollution and runoff have most likely exacerbated the degree of beach erosion (Mycoo, 2006). Concern over the effects of coastal erosion on economic development and tourism lead to the creation of the Coastal Conservation Project Unit (CCPU) charged with overseeing the island's first coastal conservation study in 1982. In 1995 the CCPU was designated as a permanent government agency and renamed the Coastal Zone Management Unit (CZMU).

The effects of erosion are of particular concern on the island's south and west coasts where the majority of tourism development is located. Moore et al. (2010) report that the long-term projected rise in sea levels (on the order of 0.5–1 m) are likely to impact more than 40 percent of hotels on the island. To mitigate damages from the changing character of the beaches, Barbados has selectively employed man-made erosion-control structures, including revetments, breakwaters, groynes, seawalls and gabions to varying degrees of success (Brewster, 2007). Barbados also has a setback requirement of 30 m from the high water mark. The continued use of such measures including beach nourishment through sand replacement is the subject of ongoing debate.

Assessments of the economic profile of the coast can aid in the development of efficient, cost-effective policies for sustainable coastal zone management (Ramsey et al., 2015). Yet, despite their great importance to the economy and culture of Barbados, most of the components of the economic value of coastal and marine resources have not been studied and remain unknown. Exceptions include work by Mahon et al. (2007), Waterman (2009), Schuhmann et al. (2013), and Gill et al. (2015).

1.1. Valuing beaches and coastal amenities

According to Pendleton et al. (2007) beaches have been valued more often in the non-market valuation literature than any other coastal or marine asset. Revealed preference approaches, such as

hedonic pricing and the travel cost method (TCM), are the most commonly employed valuation methods for understanding the economic value of shoreline amenities such as proximity and beach width. Hedonic pricing valuations of beach proximity and width to property owners consistently demonstrate that closer and wider beaches convey greater economic value. Examples include Pompe and Rinehart (1994), Pompe and Rinehart (1995), Pompe and Rinehart (1999) and Landry et al. (2003). Espinet et al. (2003), Hamilton (2007) and Rigall-I-Torrent et al. (2011) find that coastal proximity is associated with higher prices for accommodation. Numerous TCM and random utility studies suggest that wider beaches provide more recreational economic value. Examples include Parsons et al. (1999), Landry et al. (2003), Shivlani et al. (2003), Kriesel et al. (2004), Whitehead et al. (2008), Pendleton et al. (2012) and Parsons et al. (2013).

Marine litter is an important concern for coastal managers. Litter imposes significant economic costs to society through reduced tourism revenues, damage to vessels, impaired ecosystems and effects on human health (Hardesty et al., 2015; Williams and Tudor, 2001; Santos et al., 2005). Litter on beaches has been shown to detract from visitor satisfaction (Ballance et al., 2000; Jędrzejczak, 2004; Santos et al., 2005; Blakemore and Williams, 2008; Leggett et al., 2014), adversely affect the probability that beach users will return (Ivar do Sul and Costa, 2007; Beharry-Borg and Scarpa, 2010; Leggett et al., 2014) and result in economic losses to coastal communities (Ballance et al., 2000; Somerville et al., 2003; Tudor and Williams, 2003; Leggett et al., 2014).

Despite the seemingly universal understanding that people prefer to visit beaches that are clean and free of litter, and the straightforward connection between beach cleanliness and economic returns via tourism, the literature contains relatively few studies that attempt to empirically measure the economic value of beach cleanliness or the economic losses associated with beach litter, data that can facilitate the assessment of the benefits of investment in beach sanitation. Exceptions include Smith et al. (1977) who estimate annual willingness to pay (WTP) to control and clean up marine debris on beaches in New Jersey and North Carolina, Loomis and Santiago (2013) who estimate the willingness to pay for the absence of trash on beaches in Puerto Rico, and Leggett et al. (2014) who estimate the economic value of reducing of marine debris at sandy beaches in California.

Other studies associate beach litter with economic value through impacts on visitation and analysis of preferences. Blakemore and Williams (2008) find the most popular complaint by British tourists on a Turkish beach was the presence of litter, with 41% of respondents noting its negative appeal. Ballance et al. (2000) examine the impact of beach litter on foreign and domestic tourists in the Cape Peninsula, South Africa, reporting litter densities in excess of 10 large items per meter of beach would deter 40% of foreign tourists, and 60% of domestic tourists from returning to Cape Town beaches. Birdir et al. (2013) estimated visitors' willingness to pay for beach improvements at Turkish beaches, finding that more than 90 percent of visitors were willing to pay a daily fee for improvements, with over half of respondents indicating litter removal as the preferred way to improve beaches. Similar results were found by Ünal and Williams (1999).

Empirical examinations of the economic value of beach cleanliness in the Caribbean are especially limited. Beharry-Borg and Scarpa (2010) use a choice experiment administered to a sample of 284 tourists and locals in Tobago to estimate the willingness to pay for 7 attributes related to coastal and marine quality, including the number of plastic fragments encountered per 30 m of beach length. Results suggest that willingness to pay a beach entrance fee to reduce beach litter ranged from \$2.32 to \$7.72. Loomis and Santiago (2013) estimate the willingness to pay for four beach

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