Ocean & Coastal Management 51 (2008) 854–861

Contents lists available at ScienceDirect

Ocean & Coastal Management

journal homepage: www.elsevier.com/locate/ocecoaman

Hotel managed marine reserves: A willingness to pay survey

Patrik Svensson [a,b,*], Lynda D. Rodwell [b], Martin J. Attrill [a]

[a] Marine Biology and Ecology Research Centre, Marine Institute, University of Plymouth, Drake Circus, Plymouth, PL4 8AA UK
[b] Centre for Marine and Coastal Policy Research, Marine Institute, University of Plymouth, Drake Circus, Plymouth, PL4 8AA UK

ARTICLE INFO

Article history:
Available online 19 September 2008

ABSTRACT

The 2003 Marine Parks Congress recommended networks of marine reserves to be established covering 20–30% of habitats by 2012. Most marine reserves are, however, failing to meet their objectives, the main reason being attributed to lack of funding. In light of the growing need for effectively managed marine reserves, a survey ascertaining tourists' support and willingness to pay extra to stay at reserves managed by the private sector – Hotel Managed Marine Reserves (HMMRs) was conducted at Whale Island Resort, Vietnam. A total of 97.5% support HMMR, 86.3% were willing to pay, the median amounting to US$9.6/room/night, or 10% of the average room rate, equaling US$67,277 at 60% occupancy.

1. Introduction

Marine Protected Areas (MPAs), independent of their size [1], have been recognized as an effective method to sustain or increase species diversity, fish size, density and biomass from an otherwise over-fished coastline and to enhance fishing yields in the surrounding fished area through the process of 'spillover' of fish from the MPA [2–4]. A number of different types of MPAs with a variety of managing bodies have been adopted, including: government, Non-Government Organisations (NGOs), community and private management, plus various combinations thereof.

The bottom–up approach of community-managed marine reserves is widely considered key to effective reef management in the tropics [5]. Local fishermen's knowledge of the surrounding seas can help provide information of possible locations for the marine reserve and without local community cooperation and participation, reserves may quickly be confronted with protest and rejection, resulting in poaching. Community-managed marine reserves are, however, not generally managed by local communities alone but rather as a joint venture with other stakeholders – the local government, an NGO or the private sector in the form of a joint venture. In such situations, the private sector is meant to bring capital, business and marketing know-how and a client base; the community partner usually brings the location, labour and local knowledge, while an NGO or local government may mediate negotiations between the private and community partners, strengthen community capacity, provide basic infrastructure and other necessities [6].

In several circumstances, private enterprises such as hotels and resorts have taken over the day-to-day management of a protected area and, in some cases, full responsibility for the reserve [7]. In other instances, hotels have been the initiator and subsequent manager of the reserve, termed Hotel Managed Marine Reserve (HMMR), with varying degrees of participation from the local governments and/or communities. While private parks may be covering a substantial area on land and growing rapidly, they are only recently becoming more popular at sea. Private parks on land, like those at sea, are still widely undocumented and insufficiently researched, but both are believed to have been initiated because of the same reasons. Firstly, the government's inability to satisfy public demand for nature conservation, in quality and quantity alike [8,9], which has led to inefficiently managed parks "paper parks" and damaged ecosystems. In the Caribbean and Southeast Asia it was found that only 6 and 14%, respectively, of 285 MPAs reviewed were effectively managed [10,11]. Some countries have even become indebted, having to rely on international support [12]. In a report on a change in governance of protected area systems between 1992 and 2002 in 41 countries, Dearden et al. [12] found increasingly more countries, therefore, relying on a broader range of funding sources; the medium and less developed countries relying significantly more on funds from foreign governments, donations and concessions paid by the private sector (25% compared with 14% of total funding). There is seemingly a trend leading away from solely government-managed protected areas, towards increased participation of stakeholders, with the private sector, local communities and NGOs having a larger influence on protected area decision-making [12].

A second reason for the increasing number of private reserves is a growing societal interest in biodiversity conservation [8], peaking

* Corresponding author. Marine Biology and Ecology Research Centre, Marine Institute, University of Plymouth, Drake Circus, Plymouth, PL4 8AA UK. Tel.: +41 61 3216537.
E-mail address: patrik.svensson@plymouth.ac.uk (P. Svensson).

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doi:10.1016/j.ocecoaman.2008.08.001

with the World Summit on Sustainable Development (Johannesburg 2002) and, later, the World Parks Congress (Durban, September 2003), where representatives of protected areas recommended networks of marine reserves covering 20–30% of habitats by 2012.

The rapidly growing ecotourism industry is another reason why the private sector is pushing for HMMRs, where they can establish a market niche. Ecotourism has been praised as one of the most promising approaches to sustainable development and protection of important environmental resources in lesser developed nations [13]. With ecotourism, it is expected that the impact from tourism on the environment is kept to a bare minimum and that tourism benefits also profit local communities, either by employment or by contributing to community projects [6].

Today, the vast majority of HMMRs are not recognized as MPAs by The World Conservation Union (IUCN). Chumbe Island Coral Park (CHICOP) is one exception, possibly also representing the first fully functioning MPA in Tanzania [9]. Several others have, however, been initiated privately, before public protection was established [8], such as: Sugud Islands Marine Conservation Area (SIMCA), which was established as a Category II conservation area under the IUCN Protected Area Management Category in 2001, after initially being protected by Lankayan Island Dive Resort [14]; the protected zone outside Anse Chastanet Resort, St. Lucia, which was later incorporated into the Soufriere Marine Management Area (SMMA) [15]. It was the resort managers' sense of responsibility to their surroundings which was the initial driving force for the effective protection programs. This was compounded by environmental agency and community collaborations to ensure stakeholders' needs were represented.

Several other HMMRs are not officially recognized as MPAs by the IUCN, but nevertheless engage in numerous conservation and education projects. The Alegre Beach Resort, Cebu, Philippines protects a 16 ha marine sanctuary, where they have established a coral reef recovery and distillation program aimed at preserving and protecting the reef ecosystem. The program involves regular collection of the coral tissue-feeding *Drupella* snails and crown-of-thorns starfish (*Acanthaster planci*), deployment of artificial reefs, reseeding giant clams (*Tridacna* spp.) and developing mussel farms intended as a source of alternative livelihood for surrounding communities. They also dredge silt from the reef flat to increase coral recruitment and settlement potential, and stabilize the benthos by planting seagrass beds. The projects are overseen and monitored by a marine biologist (Mar Cruz, Alegre aqua sports manager, pers. comm.). The owners of Wakatobi Dive Resort in south-eastern Sulawesi, Indonesia, pay a leasing fee to the affected communities of their 200 ha no-take sanctuary and 500 ha buffer zone, where fishing with traditional fishing gear is permitted. Representatives of the communities patrol the area and enforce compliance with agreed extractive bans. Amongst others, the resort owners sponsor school material, give lectures on conservation issues, provide funding for wastewater management and public projects to 17 affected communities, and employ 135 people locally (Lorenz Maeder, resort owner, pers. comm.).

These hotels have succeeded in establishing effectively protected marine reserves since they have successfully incorporated the local communities into their hotel and conservation projects. Like many dive resorts they also have boats, personnel and other equipment needed to manage local protected areas and the financial backing and incentive to protect their assets [7], but depending on the extent of their conservation projects, a little financial backing from guests in the form of HMMR user fees can go a long way. Tongson and Dygico [16] found that tourists can appreciate user fees as they are a direct means to contribute to conserving the natural resources they will enjoy. Several studies actually suggest that tourists and divers are willing to pay substantial user fees to enter MPAs, which can financially supplement or even completely cover conservation costs [16–18]. It is suggested that MPAs only start to become successfully managed when funding is secured through self-financing [19]. The constant supply of funding from user fees could, therefore, be a solution to financing and thereby effectively managing protected areas [20].

Projects, which may require financial assistance, include monitoring coral reefs, mangroves or other marine life, including sharks, dolphins or turtles, and maintaining turtle hatcheries. Projects may also involve creating artificial reefs out of concrete domes or using mineral accreting technology owned by Biorock™ to transplant coral. Other HMMRs have developed education or awareness programs for tourists, staff and local communities.

In addition to project costs, associated resources and salary costs, HMMRs generally also need to pay for the area covered by the marine reserve. This can take the form of a lease or tax to be paid to the local government [7]. In some instances a portion of user fees are delivered to local communities to build schools, hospitals or to improve infrastructure, or given to fishermen to compensate for any fishing grounds lost [8]. The costs accrued to manage HMMRs will ultimately dependent on the conservation projects they are involved in, their management set-up, location and size.

A willingness to pay (WTP) survey was conducted at an HMMR in Vietnam in order to gauge tourists' knowledge and interest in marine conservation, the importance of various factors in choosing and locating hotels, their opinion of HMMRs, and whether tourists would be willing to pay a user fee to support HMMRs. The consumer surplus was also calculated with the intent of establishing the elasticity of demand for HMMRs, resulting in the optimal user fee.

2. Study area

The tourist surveys were conducted with the hotel guests of an HMMR bi-annually over a six-week period in March/April and September/October, starting Autumn 2005, ending Spring 2007. The HMMR, Whale Island Resort (WIR), is situated on Hon Ong, a small island (approx. 100 ha), located on the south-central coast of Vietnam, 80 km north of Nha Trang, in Van Phong Bay (Fig. 1). The resort was established in 1997 with only a few bungalows. Today, WIR owns 32 bungalows accommodating maximum 70 guests. The average length of stay is three nights and average yearly occupancy is approximately 60%.

The hotel owners became concerned when they noticed the continued decline in fish and coral populations believed to be caused by over-fishing and destructive fishing techniques, such as hose and hook fishing, blast fishing and cyanide fishing. This was compounded by pollution and rubbish dumping from the nearby village of Dam Mon and other smaller villages within the bay. They. therefore, decided to enclose the bay around the resort with buoys in 2001 (Whale Island Bay, WIB), establishing a no-fishing zone and a *de facto* 11 ha marine reserve. In August 2005, a second bay was enclosed on the other side of the peninsula (Whale Island Bay Peninsula, WIBP), creating a 5 ha marine reserve (Fig. 1). Local communities were actively consulted before the areas were enclosed. Legal permission to close off these areas was attained from the local authorities of Khanh Hoa Province in the form of a 10-year lease, and initialization was supervised by the local coastguard.

The resort is eco-friendly albeit not certified; it generates low amounts of pollution from the ferry shuttling guests and supplies to the mainland, plus the activities of the daily dive boat. The effluent is collected in a septic tank, filtered, and later used as irrigation water; pamphlets are provided in the bungalows urging guests to be mindful of the environment and to avoid any trampling or damaging of the corals; inorganic wastes are collected from the beach and burned in a specially constructed high-heat furnace. The

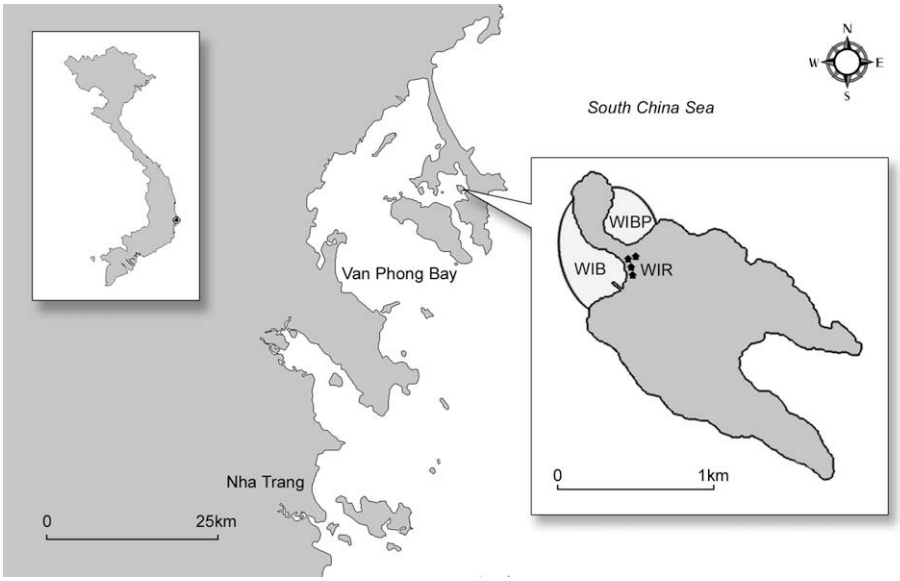


Fig. 1. Illustration of Whale Island (Hon Ong) showing the Resort, the 11 ha Whale Island Bay (WIB) and the 5 ha Whale Island Bay Peninsula (WIBP) reserves in Van Phong Bay, Khanh Hoa Province, Vietnam.

hotel has hired security officers who also acts as a reserve wardens, ensuring that no fishing is conducted within the reserves. Furthermore, specific hiking trails have been hewn into the landscape to restrict damage; several clusters of artificial reefs have been constructed out of ceramic pots and concrete domes to serve as substrate for their coral transplantation project, while creating habitat complexity for fish, increasing fish assemblages. Fish Aggregating Devices (FADs) have also been constructed, made from cut-up strips of netting, bound together, fastened to buoys and anchored to the sea floor at 9 m depth, attracting schools of fish, including large schools of Snapper (Lutjanidae), Jacks (Carangidae) and Barracuda (Sphyraenidae). It is unclear whether the marine reserve produces spillover of fish to help replenish adjacent fished areas, but the density, size and diversity of fish are significant compared with unprotected areas [21].

Apart from the managers and owner, the 40–50 staff are all from local villages and are paid above average salaries. The hotel purchases the majority of their food and beverages from local fishermen and other local vendors and the resort owner has built a school and temple. The lease paid to the local government is supposed to help provide for community needs but to what extent it helps individual fishermen more affected by the loss of a part of their fishing ground is unclear. Several fishermen do not have enough money to purchase larger boats to fish outside Van Phong Bay and must, therefore, rely on fishing in smaller bays closer at hand. Some of these families have expressed some displeasure with the reserve, while other fishermen, family members of staff, and vendors, benefit from the reserve and approve of their conservation efforts (unpublished survey data collected by PS), While the reserves are protected by a contract between WIR and the local government ensuring wider compliance to the no-fishing ban, a method for compensation or integration of affected families should perhaps be considered. An amicable relationship with local community members with agreed goals is important to effectively manage a marine reserve, especially if the HMMRs are owned by foreign investors.

3. Tourists' willingness to pay

A total of 211 questionnaires were completed by tourists during the four, six-week research visits between Autumn 2005 and Spring 2007. These qualitative and quantitative, open and close-ended questionnaires were placed on the reception desk, so the hotel guests could complete them at will, but usually they were completed during check-out. Although these questionnaires draw on a convenience sample restricted to the sample group of the hotel guests, we feel that while a survey conducted with random tourists at several locations would ultimately increase population representation, the great range in age, income, environmental knowledge and level of education at the hotel, nevertheless makes this survey representative for travelling tourists.

In this anonymous questionnaire, guests were asked to complete a demographic and personal questions section; a set of behavioural choice questions relating to the methods and reasons for choosing hotels; questions related to their environmental awareness and interests; their opinion of the biophysical state of the HMMR compared to unprotected areas; their thoughts on hotels or resorts acting as caretakers and mangers of marine reserves and how this should be advertised; and lastly, if they would be willing to pay extra for HMMRs, and if so, how much.

For the final WTP questions, a hypothetical scenario was laid out. The respondents were requested to decide if they would be willing to pay more to stay at a hotel which is managing a marine reserve, compared to an adjacent hotel, which is not, all else being equal. The follow-up question asked them to specify how much more they would be willing to pay per night in either US$ or as percent of the room rate. The additional choice to provide a WTP amount as percent of the room rate was added to the fixed US$ option because during the initial interview-based pilot surveys, the majority of tourists requested this possibility on their own accord. To convert the percentage value into monetary terms, the room rate of WIR was used as a model. The average length of stay of three nights was determined as the actual room rate (US$96) since the room rate decreases with the number of nights stayed. All percentage responses could thereby be converted to US$ and the median and average WTP calculated for the sample population. An open-ended WTP contingent valuation question, where respondents specify the amount themselves, was chosen over a dichotomous choice question because this is the first survey of its kind and we did not wish to assume on the distribution of WTP and encourage biased responses by providing pre-defined ranges [22]. Open-ended questionnaires are also understood to give a lower

WTP [23]. This was preferred, since it is suggested that when people are faced with hypothetical scenarios involving payment, they are often over-generous [24]. While they may hypothetically agree to pay a certain amount, they would commonly only agree to half in reality [25].

In order to determine statistical significance between variables and WTP amounts, we employed the non-parametric tests, Mann–Whitney *U* and Kruskal–Wallis *H*, to test the null-hypothesis that the two or more samples were drawn from a single population. We used the Chi-square cross-tabulations test to reveal significance between reasons provided for WTP. Tests excluded tourists who did not wish to comment on their WTP and ignored the final question. One additional sample was removed from the populations because the WTP was deemed far too high to be considered serious (200% of room rate per night).

We calculated the consumer surplus based on the amount guests were willing to pay and calculated the total revenue the resort could make, depending on various user fees the resort could implement per room for nights stayed.

4. Results

The European community prevailed in this study, the more numerous being the British, Dutch and then French. While the majority of the visitors resided in their home countries, one-tenth of the visitors had taken up Vietnamese residency (included in 'Other', which also includes the rest of Asia, South and Central America – Table 1). University educated visitors dominated and 69% of the population were between 26–45 years old. A larger percentage of the sample comprised women and the income level was split throughout the spectrum.

There were no significant relationships between these variables and WTP. Although there was a trend in certain categories for higher WTP, such as visitors aged 36–45 and those with PhD level education (Kruskal–Wallis $p = 0.273$, $df = 4$; $p = 0.168$, $df = 3$), the amount visitors were willing to pay varied widely, resulting in high variance (Table 1).

In the next section, tourists were confronted with behavioural choice questions: top three methods they use to locate hotels; how they located WIR; the importance of various factors for choosing hotels and the top three reasons for choosing WIR.

The method most commonly used to find tourist's choice of hotel was the internet (31.76%), followed by word of mouth (23.05%) and travel guides (22.87%). This was also the order demonstrated by guests choosing WIR (29.33%, 28.37%, and 20.67%). The method least chosen for locating hotels was 'environmental hotel award sites (0.73%), which is not so surprising since only 10.9% of the population said they knew where to look for environmentally friendly hotels (Table 2) and of these, approximately half the tourists' responses were vague, writing only 'internet'.

On a Likert scale from one to five, tourists were asked to rate certain hotel attributes in order of importance. Location was the most important attribute when choosing a hotel, followed by price, facilities, service and lastly, environmental awards (Fig. 2). The importance of 'location' also became apparent when asked why they chose WIR, the top two reasons being, 'away from mass tourism' and 'island setting' followed by facilities: SCUBA diving and snorkeling. Eco-friendliness came in forth place ahead of service and safety (Fig. 2).

In the following section dedicated to tourists' environmental awareness, interests and knowledge, a larger percentage already knew that WIR was an eco-friendly resort before arriving on the island, while the majority of visitors also knew what MPAs are and would like to have access to hotels' environmental policies before staying at a hotel (Table 2). The latter two were the only significant indicators of WTP found from this survey. While having access to hotels'

Table 1
Breakdown of tourists' demographic and personal data and their WTP (US$) extra to stay at an HMMR with Standard Errors (SE)

	Visitors (%)	WTP ($)	SE
Nationality			
European	69.46	12.55	1.01
Oceanian	16.75	14.88	3.97
North American	8.87	11.37	2.43
Other	4.93	15.49	2.63
Country of residence			
Europe	62.07	12.58	1.11
Oceania	15.27	15.66	4.23
North America	6.40	11.60	3.36
Other	16.26	12.53	1.26
Gender			
Female	56.31	12.46	1.08
Male	43.69	13.44	1.68
Age			
<26	10.10	9.30	1.74
26–35	44.23	11.73	1.22
36–45	25.00	16.63	2.73
46–55	10.10	12.40	2.44
>55	10.58	12.14	1.51
Education			
Secondary school	9.52	13.47	2.63
College	21.43	14.76	3.32
University	62.38	11.63	0.89
PhD	6.67	17.80	2.92
Gross income/year ($)			
No income	5.05	11.33	2.77
<15,000	4.04	10.71	1.95
15,000–30,000	15.66	14.01	3.33
30,000–45,000	18.18	15.31	2.54
45,000–60,000	20.71	13.78	2.68
60,000–75,000	14.65	11.84	1.71
75,000–90,000	9.60	9.76	1.47
>90,000	12.12	12.42	1.80

The sample comprises the available data from 211 surveyed guests minus 24 unusable samples. The WTP is the average, converted from % room rate where necessary, based on US$96/room/night.

Table 2
Breakdown of tourists' environmental awareness and knowledge and their WTP (US$) extra to stay at an HMMR with Standard Errors (SE)

	Visitors (%)	WTP ($)	SE
Know what MPA are?			
Yes*	78.10	13.69	1.15
No	21.90	9.89	1.41
Know how to find eco-friendly hotels?			
Yes	10.95	10.77	1.56
No	89.05	13.09	1.40
Would like to see hotel's environmental policy?			
Yes**	76.19	13.35	1.02
No	23.81	11.27	2.34
Know WIR is eco-friendly?			
Yes	58.57	13.41	1.41
No	41.43	12.47	1.29
Support HMMR?			
Yes	97.51	14.31	1.41
No	2.49	4.32	2.58
Willing to pay?			
Yes	86.27	13.81	1.34
No	13.73	0	

The sample comprises the available data from 211 surveyed guests minus 24 unusable samples. The WTP is the average, converted from % room rate where necessary, based on US$96/room/night. non-parametric Mann–Whitney *U* test.
*$p < 0.05$, Chi-square test; and **$p < 0.001$.

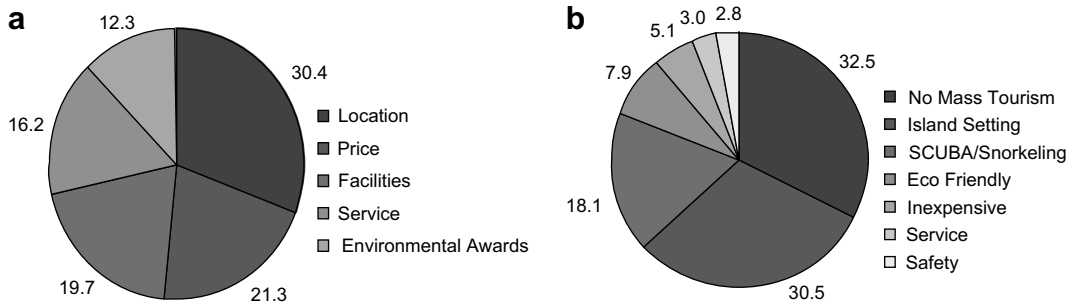


Fig. 2. The importance of various attributes to guests when choosing hotels (a) and choosing Whale Island Resort (b) expressed in % of the sample population.

environmental policies when agreeing to pay to stay at an HMMR was highly significant (Chi-square = 11.0; $p < 0.001$), whether the respondent knew what an MPA was, affected significantly the WTP amount to stay at an HMMR (Mann–Whitney $U = 2391.0$; $p = 0.047$).

Guests were thereupon asked to compare the general state of the marine environment, the fish diversity, number of fish, number of invertebrates, size of fish and coral cover within the reserve, with outside fished areas. Only 40.95% of the guests had also dived or snorkelled outside the enclosed bay, either on a dive or snorkelling trip, or if they had rented a canoe or hobby-cat and snorkelled at other areas around the Island.

The authors graded tourists' responses, giving '−1' if the tourists thought the conditions were poorer in the reserve, '0' for the same and '+1' for better conditions. All variables apart from coral cover (−0.16) averaged positively for the reserve. General state of the environment (+0.48) attained the highest rating, followed by fish diversity (+0.46), number of fish (+0.39), size of fish (+0.28) and number of invertebrates (+0.19).

In the succeeding questions, tourists were asked if they support the idea of hotels acting as caretakers and managers of protected areas: 97.51% did support HMMRs. Of the rest, nine did not have an opinion, five didn't support the concept, one of which expressing concern that the hotel would misuse the idea and profit from it; another was concerned about private ownership of public space becoming exclusionary. The remainder reserved comment since they did not have enough details.

On a follow-up, open-ended question, the majority (96.32%) reasoned HMMRs would better serve the environment, 13.50% thought private management would be better than government management, 12.88% and 12.27% thought it would benefit tourists and businesses, while others thought it would build environmental awareness (4.91%) and support fishermen (3.07%). Some were more reserved in their opinions, agreeing with HMMRs only if they were supervised and connected to an environmental agency (12.88%), or had an agreement with local communities (3.68%), while yet others considered it hotels' obligation to help protect the environment through active protection (9.82%). The remaining tourists thought the more HMMRs the better (3.68%) or that HMMRs were especially important in poor countries (3.68%).

Most guests agreed that HMMR information should best be available to them over the internet and on hotels' homepages (92.22%). A smaller contingent (17.22%) suggested that all hotels protecting marine reserves should have a website of their own, where you could browse per country for example, or that they were linked to either country environmental agency websites or diving company websites. Another faction (15%) had the same suggestions but would like the HMMRs to be incorporated into some kind of environmental standard or award system, overseen by an environmental agency. Other suggestions included brochures at the hotel (15.56%), travel guides such as Lonely Planet (9.44%), or equivalent for HMMRs (3.33%), on the country's tourism board website (6.67%), magazines (3.33%), travel agencies (4.44%) or TV advertising (2.78%).

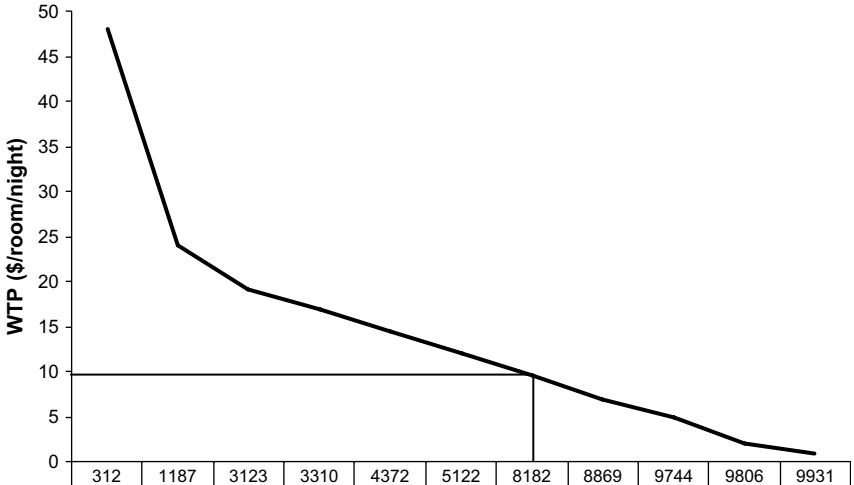
In the final WTP question, most tourists agreed they would be willing to pay more per night to stay at the HMMR (86.27%), the average being US$12.86 extra per room and night stayed, and the median: US$9.6. Of the 159 tourists willing to pay at least something, 84.28% decided to give a percent figure of the room rate. The difference between the averages given in percent (US$14.31) and in dollars (US$19.46) was significant (Two-Sample Kolmogorov–Smirnov $Z = 1.403$; $p = 0.039$).

The revenue and consumer surplus resulting from a user fee system has been calculated based on the WTP results from all tourists, willing to pay or not alike, except those who did not complete the WTP questions (11%). The results show that 85% of visitors were willing to pay at least 1% of the room rate, equivalent to US$0.96/room/night. Extrapolating this 85% to the number of rooms willing to pay per annum (9931), the hotel would make US$9534/year (Fig. 3). If all guests were to pay 1% per room per night, given an average yearly occupancy rate of 60% (7008 rooms) the resort would make US$6728 per year. If yearly occupancy increased to 70% due to HMMR marketing, the total revenue would equal US$7849. Similarly, 83.4% were willing to pay 5% of the room rate (US$4.8) and 70.1% were willing to pay 10% (US$9.6), which would amount to US$33,638 and US$67,277 per year, respectively, at 60% occupancy, to be bestowed to the management of the marine reserve, if all rooms occupied by tourists paid.

The WTP and total revenue drops dramatically beyond 10%. Only 37.4% were willing to pay 15% (US$14.4) and 26.7% were willing to pay 20% (US$19.2) of the room rate. Therefore, at 10% of the room rate and below, the demand for the HMMR is relatively inelastic and beyond 10%, the demand becomes relatively elastic and the revenue starts to decrease (Fig. 3). The consumer surplus, defined as the difference between what people are willing to pay for a good or service and what they actually pay, has been calculated based on tourists' total WTP. The total consumer surplus tourists are willing to pay beyond the normal room rate to enhance their snorkeling/diving experience and to contribute to coastal conservation has been estimated to US$162,437, based on WIR's room rate.

5. Discussion

Interestingly, the most common factors influencing WTP for other protected areas: age, education level and income [26], were insignificant when it came to WTP for an HMMR or deciding the amount, although there was some inclination towards higher WTP for tourists educated to PhD level, and those aged 26–35. The only significant variables affecting WTP were connected to a person's environmental knowledge and interest. While wishing to have access to hotels' environmental policies before staying at a hotel triggered tourists' WTP, knowing what MPAs are influenced the amount. Similar result were elicited by Dharmaratne et al. [27],



	312	1187	3123	3310	4372	5122	8182	8869	9744	9806	9931
WTP ($)	48	24	19.2	16.8	14.4	12	9.6	7	4.8	2	0.96
WTP (%)	2.7	10.2	26.7	28.3	37.4	43.9	70.1	75.9	83.4	84.0	85.0
Revenue ($)	14'990	28'482	59'961	55'614	62'960	61'461	78'550	62'085	46'770	19'612	9534
T. Rev. ($) @ 60 % Occ.	336'384	168'192	134'554	117'734	100'915	84'096	67'277	49'056	33'638	14'016	6728
T. Rev. ($) @ 70 % Occ.	392'448	196'224	156'979	137'357	117'734	98'112	78'490	57'232	39'245	16'352	7849

Number of guest rooms

Fig. 3. The percentage of guest rooms willing to pay (US$) extra to stay at an HMMR, resulting in revenue per year (US$) at 100% occupancy; and total revenue per year (US$) based on 60 & 70% occupancy if all tourists paid the specified WTP amounts; and showing the median WTP (US$9.6/room/night).

who found that people willing to become members and/or were already members of an NGO, established to manage Montego Bay Marine Park and Barbados National Park, were willing to pay more than non-members and those who showed no interest.

The average and median amounts tourists were willing to pay (US$12.86 & US$9.6) to stay at an HMMR were higher than the average and median amounts charged to divers to enter MPAs in Southeast Asia (both US$5) [17] but also lower than some WTP surveys. Divers were willing to pay on average US$27.4 to dive at the Bonaire Marine Park [28] and US$41 to dive at the Tubbataha Reefs Natural Marine Park [16]. Most commonly, MPA access is levied to individual divers, rather than dive operators, and although user fees may be charged either per dive, per day, per boat or per entry to the park, the timescale is usually per day [17]. The user fee system proposed for HMMRs is similar in terms of access to the HMMR per day, but it would not be per diver, but rather, per room, which is more likely to accommodate at least two people, and since guests are paying per night, it may potentially include an extra day, depending on arrival and departure times. Based on a median WTP of US$9.6, each tourist would then more likely be paying fees equivalent to US$4.8 per day, comparable to the average and median registered in Southeast Asia (US$5) [17].

Interestingly, 84% of respondents preferred to give a WTP value represented as percent of the room rate. The average room rate at WIR for an average length of stay of three nights amounted to US$96 (2006 rate), including meals and transportation, which could be considered on the lower end of beach resort accommodations, unless you are back-packing. The median, equivalent to 10% of the room rate per room (US$9.6) or quasi equivalent to US$4.8 per person per night could, therefore, be considered conservative, although you do have to consider that guests possibly kept WIR's room rates in mind when considering their WTP. The amount guests were willing to pay in dollars was, however, significantly higher than those who gave a WTP in percent, possibly indicating a higher believed room rate. This is likely to be influenced, however, by responses of an Australian woman and Englishman with average incomes (US$<45,000 & US$<60,000), who gave an exceptionally high WTP (US$75 & US$100). They were either very generous, or had misunderstood the question, possibly thinking it was for the length of their stay. When guests were asked why they preferred to give a WTP amount as percent of room rate, rather than a fixed dollar amount, many tourists reasoned that larger, more expensive resorts would require higher managing costs, but would ultimately also be capable of protecting a larger and 'better' reserve, compared with reserves managed by small, inexpensive resorts and the user fee should be weighted accordingly.

When tourists are actually faced with paying a user fee, they may no longer be willing to pay as much as when faced with the theoretical question of WTP. This over-estimated generous opinion of oneself has been calculated to approximately double the actual WTP [24]. There may, however, be a means to minimize this discrepancy. Research suggests that the longer tourists spend on recreational activities by the reef, the more willing they are to pay for improvements in reef quality, especially if their visit and diving/snorkeling experience meets or exceeds their expectations [18,26,29].

The average guest stays three nights at WIR, which is three to four days guests can use and benefit from the reserve. At other resorts the average length of stay may well be one week or longer, especially at dive resorts. When asked, over 90% of guests would choose to return to the resort, which suggests that their stay has met, or exceeded their expectations. Furthermore, when asked how they would compare the marine environment inside the reserve to areas they had seen when diving/snorkeling outside the reserve, except for coral cover, the responses were in favor of the marine reserve for general state of the environment, fish diversity, size and number of invertebrates. These questions have their limitations, however, because tourists are not marine biologists using unbiased monitoring methods, but rather base their answers on subjective opinions. Nevertheless, the overall tourist impression was that the hotel was effectively protecting the marine environment and

increasing diversity and biomass, which obviously also increases guests' satisfaction and makes them more willing to pay for HMMRs.

The fact that tourists could utilize the reserve for several days and seemed satisfied with both the resort and the effectiveness of the reserve probably influenced the extremely high support tourists gave HMMRs (97.5%). This, however, just demonstrates that if HMMRs are managed effectively, and results are visible, at least tourists are in favor of HMMRs and are willing to pay for privately managed conservation efforts. A number of tourists (13.5%) even suggested that private management would be better or more effective than government management of marine reserves, especially in developing countries, where funding is scarce. While the vast majority stated that HMMRs would better serve the environment, several also concluded that it would be in the best interest for tourists and for the hotel alike. The majority did not object to the possibility that the hotel could profit from marketing the HMMR and increasing occupancy, as well as protecting the environment, as long as local communities weren't disturbed, but some expressed the desire for proof, i.e. when marketing the HMMR, the marine ecosystem should then also be in a "guaranteed" better condition than unprotected areas through some kind of "official stamp". It was proposed that a suitable environmental agency verify and certify that the resort is in fact dedicated to ecotourism and marine conservation and results are favorable.

Tourists concluded that HMMRs could help build awareness for protecting coral reef ecosystems on a local and international level. Since the majority of tourists choose their hotels over the internet, most recommended that HMMRs be advertised at an easily findable website either on a country's tourism site, at a website of their own, listing all HMMRs per country, or be incorporated in an existing environmental agency website confirming hotels' advertising. Word of mouth was the second highest choice for choosing hotels, so the more HMMRs there are providing information through brochures and/or lectures on the need for protection and the hotel's conservation efforts, the more environmental awareness will spread. This would be jointly beneficial to HMMRs, enabling them to maintain a suitable WTP and to increase occupancy and prestige, delivering them into a market niche. The third most important resource for choosing hotels was travel guides. In the Lonely Planet guide, there is a caption mentioning WIR and how, through their environmental protection efforts, including transplantation of coral, they have successfully increased the number of marine species [30]. Tourists suggested trying to incorporate all HMMRs into travel guides or even create a travel guide solely for HMMRs and eco-friendly hotels, which would certainly contribute to awareness building. This brief mention in the Lonely Planet, together with word of mouth are the main reasons why the majority of tourists already knew that WIR was an eco-friendly resort, since the resort does not advertise over the internet.

Unfortunately, choosing hotels according to environmental certification or environmental award schemes was the last choice when choosing hotels, which is not surprising since the majority of tourists do not know where to look for eco-friendly hotels (89%), despite 76% wishing to see hotels' environmental policies, including awards and certifications, before booking a room. There are over 70 sustainable tourism certification programs in the world [31], either currently active or in development, which legitimize eco-friendly hotels and grant awards after scrutinized inspections, Green Globe probably being the most recognized on a global level. These and other specialized websites such as www.responsibletravel.com, or more country specific: www.turismo-sostenible.co.cr, are places where tourists can find awarded or environmentally conscious accommodations, but obviously they are not well enough advertised, or tourists are not as interested as they indicate.

Despite the current involvement of environmental award systems, the majority of tourists do not know how to locate eco-friendly hotels, causing both the environment and potential eco-friendly travelers to be neglected. It may be possible to increase tourists' awareness and interest in HMMR conservation practices if managed effectively and certified globally through a central accrediting body. Such a central body for accrediting HMMRs is currently not available, however, possibly due to the complexity of management of community, NGO and government involvement, property rights of the oceans, and the concern about private ownership of public space becoming exclusionary, but also because of the relative novelty of such endeavors. While beachfront resorts are dependent on the 'bottom line', they may not be able to profit in the long term because of the growing need and environmental concerns of a growing ecotourism clientele. Notwithstanding, if standards and controls are adopted, there will inevitably be a period when some hotels will try to proliferate on the merits of others, but will hopefully fail pending tourists' scrutinized judgment and subsequent word of mouth advertising.

The consumer surplus representing the total amount tourists were willing to pay on top of the normal room rate to stay at an HMMR equaled US$162,437, based on WIR's average room rate (US$96), which would be equivalent to US$23.18 per room per night at 60% occupancy. This amount, as well as the average WTP (US$12.86), may be considered too high; a better representation is the median US$9.6 (10% of the room rate), which 70% of tourists were willing to pay and which also amounted to the highest revenue (US$78,550) for willing-to-pay tourists (Fig. 3), demonstrating inelasticity of demand for HMMRs up to 10% of the room rate. If all guests were to pay 10% of the room rate, per room per night stayed, total revenues per annum would equal US$67,277 based on 60% occupancy. This figure is, however, only an estimate of WTP in monetary terms, since it is an example from WIR's room rate. For a 50-room hotel costing US$200 per night with 75% occupancy, total revenues based on 10% of the room rate would amount to US$273,750, a substantially higher potential fund for the MPA; even 5% would still generate US$136,875 per annum. Therefore, total revenues are dependent on the room rate, number of rooms, yearly occupancy and the user fee percentage.

A user fee of only 1% per room and night (generating US$6728/year) would nearly suffice to cover the conservation costs at WIR, covering leasing costs (the marine portion equaling approximately US$4000), moorings, maintenance and repairs (US$300), management and salaries (US$3800). The running costs of the WIR area-equivalent 15 ha marine sanctuary on Gilutongan Island, Philippines, however, requires a yearly budget of US$21,000, to pay for surveys and maintenance, community organizing, education and training, law enforcement (small patrol boat), information dissemination and salaries [32]. Therefore, a very achievable, and acceptable, fee of 5% to support WIR's HMMR would generate considerable extra income for such future investment in the MPA.

6. Conclusion

Based on the results and reasoning from this survey, several recommendations can be made which could potentially increase a hotel's chances of biological and social success, while staying economically secure.

After establishing that a hotel can lease an area of the coastline, the local communities and government should be consulted and an appropriate size and location for the reserve negotiated. The size of the reserve should be large enough to maximize biological potential, small enough to allow spillover and to be economically feasible and not so large that the loss of fishing grounds puts an unmanageable strain on local communities. Next, the hotel, local communities and government should align their reserve objectives

with an environmental agency to avoid differing interests and try to validate the MPA internationally and a user fee amount should be calculated based on stakeholders' fixed expenses. Here it is important that the needs of all stakeholders are considered and that the hotel makes every attempt to integrate themselves and help the local communities wherever possible, especially when the hotel owners are foreigners.

Tourists seem to prefer a user fee in the form of a percent of the room rate, with 10% per room per night representing both the optimal and maximum amount, considering revenue versus WTP. Only the absolute necessary amount should, however, be demanded and the hotel and environmental agency should provide clear information how guests' money is invested.

The hotels should advertise their HMMR and associated projects on their homepage and with a local environmental agency, since no central body certifying HMMRs thus far exists, providing more clarity in operations and, if possible, over the country's official tourism website and/or through dive companies. Additional advertising with travel guides, as well as information dissemination through seminars and brochures available at the hotel, explaining projects and monitored successes should be available to raise awareness and interest.

Optimal location of the hotel is important, since this is the first thing tourists consider when choosing their destination. From a biological and socio-economic point of view, the farther away the hotel is from inhabited land, the better [33], unless transportation costs and resulting pollution negate the positive benefits. Location is, however, only the first step. To assure guests' user fees are maintained, their stay must meet or surpass their expectations with visible improvements in HMMR biota compared with unprotected areas. This latter achievement may be difficult in the first few years, even with effective management; tangible projects may be an option, such as building artificial reefs to attract fish and attempting coral transplantations.

In some cases hotels have initiated marine protection, only to be incorporated into government protected areas in the future [8], including the areas protected by Lankayan Island Dive Resort and Anse Chastanet, which later developed into Sugud Islands Marine Conservation Area (SIMCA) and Soufriere Marine Management Area (SMMA) [15]. The period during which the hotels were protecting these areas could be seen as money saved by the government for an area which actually needed protecting [8].

HMMRs are quite recent developments and, therefore, still quite scarce, so further research into the effectiveness of HMMRs from a biological and socioeconomic perspective is still necessary, but this survey certainly proves interest and commitment to HMMRs from a large subset of tourists and thus the great potential of HMMRs as an economically sustainable conservation tool.

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