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A Contingent Valuation Study of Marine Parks Ecotourism: The Case of Pulau Payar and Pulau Redang in Malaysia

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Abstract

The present paper has applied dichotomous choice survey design-contingent valuation method (CVM) to investigate empirically the willingness to pay (WTP) of the visitors for ecotourism resources in two selected marine parks in Peninsular Malaysia. Hence, the purpose of this research is to estimate the value of ecotourism resources by using environmental economic tools which focuses on contingent valuation method of WTP. It uses Logit and Probit models to estimate the visitor's WTP responses for conservation the marine parks for ecotourism. The studies are based on a sample of 215 respondents in Pulau Redang and 153 respondents in Pulau Payar that were randomly interviewed for data collection for both islands in April-July 2007. The results in Pulau Redang indicate that visitors are willing to pay for conservation about RM7.8 and RM10.6 per year for local and international visitors. Meanwhile, in Pulau Payar, the result has shown that local and international visitors are willing to pay about RM7.30 and RM8 respectively. The findings may provide guideline to marine parks and to help develop management policies that enhance ecotourism contribution to sustainable development and conservation in marine parks in Malaysia.

Keywords: Contingent valuation method, Marine park, Ecotourism, Conservation, Willingness to pay, Pulau Payar, Pulau Redang

1. Introduction

Apart from the objectives related to the conservation of biodiversity, the establishment of marine parks tends naturally to have a positive effect on the enjoyment and appreciation of natural resources by the public. Marine parks encourage the development of tourism and ecotourism. These benefits can be observed in the contribution to income at national or state level due to the arrival of tourists, the generation of direct and indirect employment, and an increase in social and cultural development (Mohd Rusli et al., 2007). Marine parks are often suitable as recreational areas or picnic sites as a result of their inherent beauty. The coral reefs, fish, mangroves, coastal vegetation, beautiful beaches and clear blue waters, together with the peaceful and harmonious condition of the islands, combine to offer an area for human enjoyment. This combination is the main attraction to tourists, and might be of particular benefit to those who live in urban areas.

The current management practice for an entrance fee system in marine parks is called "Conservation Fee". Since January 1999, a conservation fee has been imposed on visitors to marine parks. The conservation fee charged for adults is RM5.00 (US$1.32) per person and half price for students, retirees and children. No price differential is made between domestic and international visitors. However, this charge does not include the domestic residents living inside the marine parks. The money from the entrance fee is put into a Marine Park Trust Fund, which is managed under the Department of Marine Parks, and used for maintenance, management and building infrastructure in marine parks.

The establishment of marine parks as protected areas in the country aims at protecting special biological and environment values. However, because of open access to marine park resources and failure of the market system in restricting their use, over-use and environmental degradation have resulted. The degradation of marine parks might affect the sustainability of ecotourism in future. In addition, the market failure is associated with users not paying the full costs of using the natural resources in the marine parks. Thus it is possible that the park may be subject to excessive use, overcrowding and biological degradation. The high level of usage may result in conflicts between users, the social and biological carrying capacity, limits of acceptable change and potential environmental degradation.

Conflicts between ecotourism uses and conservation needs arise when nature-based tourism industries rely on access and use of the resources in the protected areas. Marine parks as ecotourism sites (protected area) have considerable economic importance to the tourism industry and to local fisheries communities. The marine parks' ecotourism activities such as scuba-diving, snorkeling etc., may have potential negative effects on their ecotourism resources. Besides, beyond certain use levels, human contact with the natural resources reduces the quality of the recreational experience that can be derived from the resources.

Sustainable development of the tourism and ecotourism resources implies taking courses of action that do not jeopardize the long-term stability of the ecological systems or the survival of the key features of the cultural landscapes and marine habitat. To ensure sustainable development for the future of the ecotourism destinations in marine parks, the management approach must take into consideration the ecological, economic, social, and cultural parameters. Thus, the ecotourism development must prepare to balance the needs and preferences of visitors, contribute benefits to local people and at the same time sustain the role of conservation of marine biodiversity.

In this respect, the purpose of this research is to estimate the value of ecotourism development in marine parks in Malaysia by using environmental economic tools, a dichotomous choice CVM. The reminder of the paper is organized as follows. Section 2 describes the location of study sites, Pulau Redang and Pulau Payar Marine Parks. The third section describes the application of CVM. The fourth section outlines the methodology used, including the survey design and estimated model. The fifth section provides a discussion of the study results and the final section concludes with the summary and policy implications.

2. Location of the Study Site

2.1 Pulau Redang Marine Park (PRMP)

The Pulau Redang Marine Park (PRMP) is located in the north-eastern corner of Peninsular Malaysia, off Terengganu's coastline. They consist of 11 islands with a fast-growing popularity for tourism and ecotourism. The PRMPs can be further sub-divided into five groups, all of which have been declared as marine parks. These groups are known as Pulau Redang Marine Park (PRMP), Perhentian Island Marine Park (PPMP), Lang Tengah Island Marine Park (LTIMP), Kapas Island Marine Park (KIMP) and Tenggol Island Marine Park (TIMP).

The establishment of PRMP has helped to sustain the marine environment for its use as an ecotourism destination, besides providing an excellent opportunity for visitors to appreciate the beauty of coral, marine life and nature. The existence of the marine park centre at Pinang Island in PRMP gives an opportunity for those who visit the centre to gather relevant information about what is available to see and do within the park. They also gain the knowledge and information required to understand and observe the rules and regulations governing the park. The educational programmes also are conducted to create awareness about the protection and conservation of marine resources and their habitats. Most of the programmes involve government agencies, students, and local people continuously throughout the year to educate people about the marine park.

Nowadays, PRMP itself is becoming an increasingly important ecotourism destination in Malaysia. For example, whilst in 1995 PRMP was visited about 22,725 visitors has increased on a yearly basis, and in 2005 it received more than 123,000 visitors (Table 1). This overwhelming increase in visitor numbers now poses a serious challenge to the Parks Management, who must cater for the needs of the tourists whilst ensuring that economic concerns, environmental awareness, marine ecosystem protection and conservation are maintained, (Mohd Rusli et al., 2008).

Insert Table 1 about here

2.2 Pulau Payar Marine Park (PPMP)

The Pulau Payar Marine Park is situated off Kedah, between Pulau Langkawi and Penang. The marine park consists of a group of four islands i.e. Pulau Payar, Pulau Kaca, Pulau Lembu and Pulau Segantang. Pulau Payar is the largest of the islands with an approximate length of 1.75 km (Aikanathan and Wong, 1994). The Island is made of predominantly rock and characterised by steep cliffs and wave-cut gullies. Pulau Payar has limited strips of beach coast. Only four sandy beaches can be found in Pulau Payar with approximately 100 m to 150 m long each. The entire island is covered by dense vegetation.

The Pulau Payar group of islands constitutes one of the few coral reef areas found off the west coast of Peninsular

Malaysia. The type of coral reefs in Pulau Payar Marine Park is fringing reef. The coral fringes off the islands are shelter to a vast diversity of marine flora and fauna. Major coral genera include Acropora, Octocorals, Porites, Platygyra, Goniopora, Sponges, Corallimorph, Diploastrea and Plerogyra (Aikanathan and Wong, 1994; Harborne et al., 2000). Fish observed underwater include barracuda, giant grouper, rabbit fish, triggerfish, damsel fish and sharks (Harborne et al., 2000).

The Pulau Payar Marine Park Centre was open to public in 1989, with restriction as fisheries prohibited area. This island was gazetted as marine park in 1994. The gazettement of this island as a marine park is the first step to conserve marine resources from future impact of tourism on the island itself. Nowadays PPMP is receiving pressure from influx of visitors. The total number of visitors to PPMP has been increased in every year (Table 2).

Insert Table 2 about here

3. The Application of Contingent Valuation Method

The development of environmental valuation in Malaysia is very slow compared to other developing countries in Asia, Latin America and Africa. It began in the late 1980s and early 90s; Kumari (1995) provides some estimates about the medicinal plants from Malaysian forests; Mohd Shahwahid and Awang Noor (1999) estimates the non-timber value of Rattan from forests. The earlier stage uses of environmental valuation in Malaysia focus on the valuation of non-timber forest products. These products can be classified into two main categories, namely goods and services. Examples of goods include rattan, bamboo, medicinal plants and wildlife. Services refer to soil protection, carbon sequestration, biodiversity conservation and recreational opportunities.

Nowadays, the development of environmental valuation in Malaysia has been rapid and it is increasingly used. Furthermore, supported by academic interests and financial support, the environmental valuation methods in Malaysia are increasingly used, not only focusing on forest and recreational benefits but also on other sectors such as waste management (Jamal, 2002) and wetland benefits (Jamal and Redzuan, 1998; Alias et al., 2008). Methodological approaches for estimating the monetary value of environmental resources, including ecotourism sites, can be broadly classified into two main value elicitation groups; non-market stated preference methods and market based revealed preference methods. The revealed preference approach has the advantage of being based on the actual choices made by individuals. However, the valuation is conditional on current and previous levels of the non-market good and the impossibility of measuring non-use values. Thus, research in the area of valuation of non-market goods has seen an increased interest in another branch, the stated preference method.

Stated preference method assesses the value of non-market goods by using individual stated behaviour in a hypothetical setting. The methods include choice modeling and contingent valuation methods. In most applications, CVM has been the most commonly used approach, directly asking respondents' whether or not they would be willing to pay a certain amount of money for realizing the level of the non-market good described (Bateman and Willis, 1999).

CVM is widely used all over the world in areas of economics such as in health economics (O'Shea et al., 2008; Borghi and Jan, 2008), cultural economics (Kim et al., 2007), and transportation safety and economics (Md Nor and Mohd Yusoff, 2003) as well as in environmental economics. It is a simple, straightforward and flexible method, which has recently been widely used in environmental valuation. This method has been used intensively in environmental economics, especially for non-market valuation techniques for the last 30 years.

CVM is an approach developed by economists to value non-marketed public goods and particularly to estimate the value of improvements or damage to environmental amenities (Garrod and Willis, 1992). In contrast to private goods, public goods are not traded directly in any market and thus do not command a market price. Furthermore, the absence of markets means that the quantity desired by consumers or their preferences cannot be directly observed.

Historically, the CVM was originally proposed by Ciriacy-Wantrup (1947) who was of the opinion that analyzing the benefits of measures to prevent soil erosion generates some extra market benefits that are public goods in nature, and one possible way of estimating these benefits is to elicit the individual's willingness to pay for these benefits through a survey method (Hanemann, 1994). However, Davis (1963) was the first to use the CV method empirically when he estimated the benefits of goose hunting through a survey among the goose hunters. Afterwards, this method gained popularity and has been used around the world, including in developing countries like Malaysia. The strength and advantage of this method is its capability for estimating the use and non-use value of environmental economics. In addition, in an environmental economics valuation, CVM is the only method which can capture non-use value.

In Malaysia cases, the earliest used CVM was by Nik Mustapha (1993); valuing outdoor recreational resources in urban parks; Willis et al., (1996) studies on Forest Recreation Amenities services; Jamal and Redzuan (1998) and Alias et al., (2008) studies on wetland benefits; Dayang Affizah et al., (2007) and Zaiton (2008) conservation benefits in National Parks; Puan Chong et al., (2005) on recreational benefits in Highland Forest. However, most of them studied the economic value of recreational benefits based on forest resources except Yeo (2004) in their studies of Marine Parks. Thus, the application of CVM in this study was introduce and through this initiative, produces a great contribution in

terms of variety in methodological approaches; payment vehicles and elicitation format used. In addition, lack of research conducted in marine parks environment perhaps will contributes to empirical knowledge in terms of variety of values, which is good in validity and reliability of the results for the policy purposes in future.

Nik Mustapha (1993) was carried out at Tasik Perdana recreational area in Kuala Lumpur using the dichotomous choice contingent valuation method incorporating the logit and probit models. The mean willingness-to-pay ranged from RM84 to RM106 from both models while the median WTP ranged from –RM109 to RM36. Median WTP measures was argued to be more robust than the mean WTP, and in this study he concluded that the median WTP figure for the outdoor recreational resources in Tasik Perdana recreational resources in Tasik Perdana was about RM36.

Alias et al., (2002) conducted a study of willingness of Local Tourists to Pay for Conservation of Tourism Sports in the Damai District Sarawak. The study applied the dichotomous choice of Contingent Valuation Method (CVM) to visitors sampled randomly. Results using the logit model indicated a per person median value of RM11.64 WTP for the preservation of Damai.

Alias and Ruhana (2003) apply the dichotomous choice CVM to the outdoor-recreational resources of the Malaysian Agricultural Park, Bukit Cahaya Sri Alam, Selangor. The WTP figure derived from the model shows that visitors are willing to pay higher fees than the present fees charged. Jamal and Shahariah (2003) applied the Dichotomous-Choice Contingent Valuation Method on Paya Indah wetlands in Kuala Langat, Selangor to estimate the non-marketed benefits of conserving the wetland from the perspective of non-users, in particular among urban households in Selangor. Results indicate that the mean willingness to pay (equivalent surplus), which reflects the non-use values of Paya Indah wetlands, accrued to urban non-user households in Selangor ranges from RM28 – RM31 annually. From all studies mentioned above, it is revealed that the large sum of monetary value that visitors are willing to pay indicates that the magnitude of social benefits that society obtains from conserving nature is highly valued by the general public.

4. Methodology

4.1 CVM Theoretical Framework

This study attempts to measure conservation benefits from visitors perspective (use values). The contingent valuation method (CV) is used to derive willingness to pay (WTP) of users in PRMP and PPMP for conservation of marine ecotourism resources. From this value, the aggregate monetary benefits of conserving marine parks are estimated. In estimating this value, the CV with close-ended WTP elicitation format was employed.

Contingent valuation is defined as 'any approach to valuation of a commodity that relies upon individual responses to contingent circumstances posited in an artificially structured market' (Seller et. al., 1985). In the studies for marine parks, individuals were asked directly to reveal how much they were willing to pay to avoid some assumed levels of decline in the provision of a group of services representing a certain quality of marine parks resources as a marine ecotourism destination.

The theoretical basis of CV used in this study is the equivalent surplus (ES) measure of welfare, which measures the amount a person is willing to pay or accept to place him on a better utility or welfare level if changes in quality of goods in question do not occur.

4.2 Questionnaire Design

The survey questionnaire is a survey instrument that sets out a number of questions to elicit the monetary value of a change in a non-market good. Hence, it should be designed to get respondents to think seriously about the topic of interest, to provide the necessary information for them to be able to make informed decision and to encourage them to identify and reveal their monetary valuations.

Contingent valuation method (CVM) uses survey question to elicit the society's preference for public goods by creating a hypothetical market. CVM questionnaires can be designed to elicit willingness to pay (WTP) or willingness to accept (WTA) estimates for a change in the level of provision of a public good. Eventually, the decision to use WTP or WTA depends on the property rights of the good. However, WTA estimates are often biased upwards; therefore most of CV studies are designed to elicit WTP estimates (Mitchell and Carson, 1989).

Questionnaire for this research has been designed to gather primary information such as socio demographic profile, attitude, and visitors' willingness to pay for ecotourism resources in marine parks. The questionnaires consist of structure question that divided into two forms: dichotomous choice and multiple categories question. Generally, the questionnaire will divided into four categories; (a) characteristic of visitors and society, (b) attitude of visitors in relation to sustainability of ecotourism resources, (c) visitor's perception about ecotourism resources, and (d) willingness to pay of visitor for marine parks conservation fee (bid price presented).

A dichotomous choice question offers just two answer choice, yes or no. Meanwhile, the multiple categories question has more than two answers. Dichotomous choice is a single, "take it or leave it (TIOLI)" bid offer presented to each respondent. This technique is simple and inexpensive to administer by mail. However, the information derived from

the responses must be transformed into WTP or WTA estimates based upon a utility theoretic method which predicts the probability of a yes response.

For the purpose of this study, primary data from 153 visitors were collected in PPMP and 215 visitors in PRMP through interviews by mean of questionnaires. Information on socio-economic characteristics of respondents obtained included race, place of origin, age, marital status, education, size of family members, occupation, and monthly and supplementary gross income. The personal interviews were conducted on visitors at both marine parks by filling the questionnaires at the chosen location. Each of the respondents was told regarding the details on the purpose of preservation of island, facilities available and format used in Contingent Value techniques. Respondents were asked the following question and required to respond either 'Yes' or 'No':

'If the conservation fees are increased by RM x, would you willing to pay so that you could continue to use this ecotourism site?'

Where x ranged from RM6 to RM10, representing a 'reasonable' additional amount of conservation fee to many privately managed marine parks in Malaysia.

4.3 Willingness to Pay Estimation

Following recommendations from environmental literature (Arrow et al., 1993), the closed-ended (CE) WTP approach to estimate the benefits from the conservation and preservation the marine parks was used. The Visitors were asked as whether they would pay specific additional fees amount for a given commodity, with possible responses being "YES" and "NO". The bid amount is varied across respondents and the only information obtained from each individual is whether his/her maximum WTP is above or below the bid offered.

Logistic regression technique was used to estimate WTP (Hanemann, 1994). Using this approach the probability of saying "YES" to a bid at different level of the independent variable is estimated as

$$P = (1 - e^{-x})^{-1} \tag{1}$$

Here, x is the "bid amount" (price), and P is the probability of accepting the price. Mean WTP is estimated as the area under this probability function. This area shows the proportion of the population who would consume the good at each price level, and their associated utility. The area under the curve is estimated by integration techniques and can be expressed as;

$$E(WTP) = \int_{L}^{U} (1 + e^{a + bPRICE})^{-1} \, dPRICE \tag{2}$$

where $(1 + e^{a + bPRICE})^{-1}$, are the probability of saying "YES" and U and L the upper and lower limits of the integration respectively.

Estimating mean WTP within this framework relies on making some assumption about upper and lower limits of the integral, i.e. knowing the price amounts at which probability saying "NO" is zero and probability saying "YES" is one. Applying this to marine parks, and assuming that individuals will not pay if they receive a disutility from it, negative WTP can be ruled out and zero is used as the lower limit. Bishop and Heberlein (1979) and Sellar *et al*. (1986) used the upper range for the integration of their price amounts as the upper limit for the integration. Hanemann (1994) argued that such an approach makes a certain assumption about the probability distribution for the unknown WTP in the sample. He argued that the upper limit should be infinity and that using the highest offered amount may be a poor approximation of the mean utility estimated when integrating between zero and infinity. In this study, zero was chosen as the lower limit of the integral and the maximum value as the upper limit. Confidence interval of WTP also calculated using the variance-covariance matrix and a technique adopted for dichotomous CVM by Park *et al*. (1991).

The ability to seek willingness to pay is represented by the dichotomous variable of WTP with values of 1 for those willing to pay the additional amount of conservation fee and 0 is otherwise. An OLS regression of the above relationship with WTP as the dummy variable is beset by several problems namely: (1) non-normality of the error term, (2) heteroscedasticity, and (3) the possibility of the estimated probabilities lying outside the 0-1 boundary (Gujarati, 1988). Since the dummy WTP is actually a proxy of the actual propensity or ability of willingness to pay, the probit and logit models guarantee that the estimated probabilities lie in the 0-1 range and that there are nonlinearly related to the explanatory variables. The differences between these two approaches are mainly in the distribution of the regression error terms. The logit approach assumes that the cumulative distribution of the error term is logistic while probit assumes that is normal.

5. Results

5.1 Sample Characteristics

The socio-economic characteristics of respondents for both islands are shown in Table 3. The trends of sample demographic for these areas are similar. Majority of the respondents were in their mid-twenties to mid-thirties, college and university graduates and work with private sectors. However, majority of respondent's income levels for PRMP was higher than income level in PPMP. People in this age category with this level of education attainment and higher in income level are likely to be aware of conservation and environmental issues. However, with demographic variables, there seems to be no consensus on the economic literatures as to the sign and important of income on conservation and environmental concern.

Insert Table 3 about here

5.2 Contingent Valuation Method Estimates

Table 4 shows only PRICE, INCOME and LOCAL TOURIST among demographic variables had significant impact on WTP for conservation of marine ecotourism in Redang Island Marine Park. Meanwhile, in Pualau Payar marine Park, PRICE and INCOME variables only had significant. Other socio-demographics variables such as age, gender, employment, educational levels are not significant for both models. However, in this case, both results show consistent with findings in the economic literature where the influence of these variables on WTP environmental services is not conclusive.

Insert Table 4 about here

Income is a significant variable and positive relationship in the analysis for both models (logit and probit) for PRMP and PPMP which consistent with some of previous studies in marine parks. Normally, high-income respondents put a premium on environmental conservation compared with their lower income.

Table 5 shows the results of estimating of mean WTP for PRMP and PPMP. Estimating the logit model at the sample mean predicted respondent WTP value equal RM7.84 for local tourist and RM10.63 for international tourist for PRMP. It is worth noting that the mean WTP value quoted by local respondent below the mean WTP value international respondents. This disparity in WTP given the higher income of foreign tourist and their better ability to pay compared domestic tourists in PRMP.

Insert Table 5 about here

However, estimated respondent mean WTP for PPMP much lower than PRMP (Table 5). The respondent mean WTP was RM7.26 for local tourist and RM7.96 for international tourists. Estimating the mean value for this island had not much different among local and international tourists. The relatively lower estimated in this study could be due to a number of factors. First, there does not appear to be any significant difference between domestic and international tourists although the latter tend to have significantly higher income in profile. Secondly, this small disparity in WTP values among local and international tourists perhaps related to ecotourism resources and recreational activities available in PPMP. Some of the international tourists quoted the lower value on their WTP might be they are unwilling to pay more due to spoiled with un attractive of coral, lack of facilities etc. Infect, they are already spend more of their expenses on package price to visits the island.

To compute the aggregate benefit of conservation in both study sites, we used the estimated WTP from Table 6. The numbers of parks visitors of 11 years (1995-2005) were used; resulting in a figure of 0.71 mil visitors to PRMP and 1.13 mil visitors to PPMP over the period. By using the mean WTP for logit and probits models, gives the average benefits estimate of RM 0.064 mil per year for PRMP (Table 6) and RM0.103 mil for PPMP (Table 7).

Insert Table 6 & 7 about here

To translate these annual benefits into the total present values of the conservation of ecotourism, we discounted the benefits accruing using an estimate of the sicoal discount rate. A social discount rates is appropriate here because the parks is a public good and should be lower than Malaysia market interest rate. An estimate of 3% of discount rate eas used in this calculation. Using this rate, the estimated present value of conservation benefits in PRMP is estimated to be between RM4.25 mil to RM4.7 mil. Meanwhile, the estimated present value of conservation benefits for PPMP between RM6.2 mil and RM7.0 mil.

6. Conclusion and Policy Implications

The aim of this study was to estimate the WTP for conservation benefits and economic benefits of ecotourism in PRMP and PPMP. Given concerns about increasing coral reef damage in marine parks and lack of awareness among visitors on marine beauty resources, the results of the study could be useful to park management in setting appropriate conservation fee.

In PRMP, the results indicate that visitors are willing to pay about RM7.80 to RM10.60 per annum for conservation, resulting in total benefits of between RM4.25 mil to RM4.7 mil. Meanwhile in PPMP the visitors are willing to pay about RM7.26 to RM7.95 per annum, resulting in total benefits of between RM6.2 mil and RM7.0 mil, using a social discount rate of 3%.

The estimated conservation fee or entrance fee in this study is very low compared to other related study. A closely related study was that conducted by Yeo (2004) on estimating the recreational benefits of the coral reefs in Pulau Payar Marine Park. She found that the mean WTP for entrance fee was RM16. In her study, the payment card elicitation format used which produced higher estimates of WTP compared to this study. In addition, different environment, quality of site, quality of facilities and services and characteristics of visitors definitely contributed to higher in WTP. All these suggest a higher WTP value for PPMP in previous studied by Yeo (2004) compared to the WTP value derived in this study.

The implication of this study is important as a guideline to assist the park management or decision-makers in terms of welfare measures such as ecotourism and conservation benefits especially considering the importance of our natural resources in order to meet developmental needs and other economic activities. The result of this study may also be incorporated in the economic analysis for determining the viability of conserving the marine ecosystem in the long run. Furthermore, the estimated benefits obtained from this study (source) may be transferred to other similar marine parks for the purpose of policy or management decisions affecting the target resource.

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Table 1. Number of Visitors to Pulau Redang Marine Park

	Domestic		International		
Year	**Visitors**	**%**	**Visitors**	**%**	**Total**
1995	18,690	82.2	4,035	17.8	22,725
1996	26,988	77.7	7,755	22.3	34,743
1997	30,258	83.6	5,940	16.4	36,198
1998	26,922	78.1	7,544	21.9	34,466
1999	39,449	83.9	7,559	16.1	47,008
2000	43,390	82.4	9,244	17.6	52,634
2001	65,539	89.1	8,041	10.9	73,580
2002	56,263	88.2	7,563	11.8	63,826
2003	71,654	94.0	4,565	6.0	76,219
2004	111,225	78.1	31,251	21.9	142,476
2005	98,863	80.3	24,296	19.7	123,159

Source: Department of Marine Parks

Table 2. Number of visitors to Pulau Payar Marine Park

Year	Local Visitors	%	International Visitors	%	Total
1995	23,484	33.3	46,935	66.7	70,419
1996	25,254	28.0	65,053	72.0	90,307
1997	23,174	25.4	67,993	74.6	91,167
1998	19,869	22.8	67,423	77.2	87,292
1999	16,557	19.9	66,689	80.1	83,246
2000	19,944	18.7	86,836	81.3	106,780
2001	38,027	29.8	89,514	70.2	127,541
2002	56,269	42.1	77,516	57.9	133,785
2003	44,921	39.0	70,303	61.0	115,224
2004	36,282	26.8	98,990	73.2	135,272
2005	19,607	20.8	74,492	79.2	94,099
2006	26,043	23.1	86,605	76.9	112,648

Source: Marine Park Unit, Kedah.

Table 3. Socioeconomic Profile of Respondents in PRMP and PPMP

	PPMP (n=153)		PRMP (n=215)	
	Freq.	Percent	Freq.	Percent
Gender				
Male	71	46.41	125	58.14
Race				
Malay	17	11.11	94	43.72
Chinese	69	45.10	108	50.23
Indian	7	4.58	2	0.93
Others	60	39.22	11	5.12
Education level				
Primary school	2	1.31	8	3.72
Secondary school	19	12.42	57	26.51
College/institute	42	27.45	51	23.72
University	90	58.82	99	46.05
Marital status				
Single	81	52.94	86	40.00
Married	71	46.41	126	58.60
Widow	1	0.65	3	1.40
Employment status				
Student	9	5.88	13	6.05
Self-employed	23	15.03	24	11.16
Work with government	15	9.80	28	13.02
Work with private sector	104	67.97	131	60.93
Others	2	1.30	19	8.84

Age				
Less than 25 year	37	24.18	3	1.40
26 - 30 year	47	30.72	91	42.33
31 - 35 year	33	21.57	62	28.84
36 - 40 year	14	9.15	32	14.88
41 - 45 year	10	6.54	18	8.37
46 - 50 year	8	5.23	4	1.86
More than 50 year	4	2.61	0	0
Origin of tourist				
Domestic tourist	69	45.10	164	76.28
International tourist	84	54.90	51	23.72
Income level				
Less than RM1000	6	3.92	11	5.12
RM1001 - RM2000	19	12.42	85	39.53
RM2001 - RM3000	30	19.61	43	20.00
RM3001 - RM4000	9	5.88	22	10.23
RM4001 - RM5000	31	20.26	16	7.44
More than RM5000	58	37.91	38	17.67

Table 4. Parameter Estimates for Dichotomous Choice Model for Pulau Redang and Pulau Payar Marine Parks

	Pulau Redang		**Pulau Payar**	
	Logit Model	**Probit Model**	**Logit Model**	**Probit Model**
Intercept	3.0850	1.8914	2.702440	1.649900
	(2.9151)*	(2.9974)*	(2.1013)	(2.1314)
PRICE	-0.2257	-0.1413	-0.303611	-0.178748
	(-2.4263)*	(-2.4899)*	(-1.8405)	(-1.7978)
INCOME	0.00019	0.00012	0.000057	0.000027
	(2.2759)*	(2.3360)*	(1.9281)	(2.0446)
LOCAL TOURIST	-1.3903	-0.8232	-	-
	(-2.5852)*	(-2.7265)*	-	-
Log-likelihood	-120.7700	-120.3300	-88.9270	-89.2834
MCFADDEN R-SQUARE	0.1314	0.1346	0.0577	0.0540
% Right Prediction	66.98	66.98	69.28	69.28

Note: Figure in the parentheses is t-ratio

* Significant at 1% level

Table 5. Estimating of Mean WTP for Pulau Redang and Pulau Payar marine Parks

		Pulau Redang	**Pulau Payar**
Model	**Visitors Origin**	**WTP (RM)**	**WTP (RM)**
Logit Model	Domestic visitors	7.84	7.26
	International visitors	10.63	7.95
Probit Model	Domestic visitors	7.11	6.73
	International visitors	9.81	6.45

Table 6. Estimated Benefits (RM) of Conservation Pulau Redang based on Logit and Probit Analysis

Year	Number of Visitors		Logistic Model			
			Logit Model		Probit Model	
	Domestic	International	Domestic WTP = 7.8	International WTP = 10.6	Domestic WTP = 7.1	International WTP = 9.8
1995	18,690	4,035	146529.6	42892.1	132885.9	39583.35
1996	26,988	7,755	211585.9	82435.7	191884.7	76076.55
1997	30,258	5,940	237222.7	63142.2	215134.4	58271.4
1998	26,922	7,544	211068.5	80192.7	191415.4	74006.64
1999	39,449	7,559	309280.2	80352.2	280482.4	74153.79
2000	43,390	9,244	340177.6	98263.7	308502.9	90683.64
2001	65,539	8,041	513825.8	85475.8	465982.3	78882.21
2002	56,263	7,563	441101.9	80394.7	400029.9	74193.03
2003	71,654	4,565	561767.4	48526.0	509459.9	44782.65
2004	111,225	31,251	872004.0	332198.1	790809.8	306572.3
2005	98,863	24,296	775085.9	258266.5	702915.9	238343.8

Table 7. Estimated Benefits (RM) of Conservation Pulau Payar based on Logit and Probit Analysis

Year	Number of Visitors		Logistic Model			
			Logit Model		Probit Model	
	Domestic	International	Domestic WTP = 7.26	International WTP = 7.95	Domestic WTP = 6.73	International WTP = 6.45
1995	46,935	23,484	70,419	186,698	315,873	151,472
1996	65,053	25,254	90,307	200,769	437,807	162,888
1997	67,993	23,174	91,167	184,233	457,593	149,472
1998	67,423	19,869	87,292	157,959	453,757	128,155
1999	66,689	16,557	83,246	131,628	448,817	106,793
2000	86,836	19,944	106,780	158,555	584,406	128,639
2001	89,514	38,027	127,541	302,315	602,429	245,274
2002	77,516	56,269	133,785	447,339	521,683	362,935
2003	70,303	44,921	115,224	357,122	473,139	289,740
2004	98,990	36,282	135,272	288,442	666,203	234,019
2005	74,492	19,607	94,099	155,876	501,331	126,465